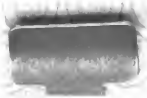
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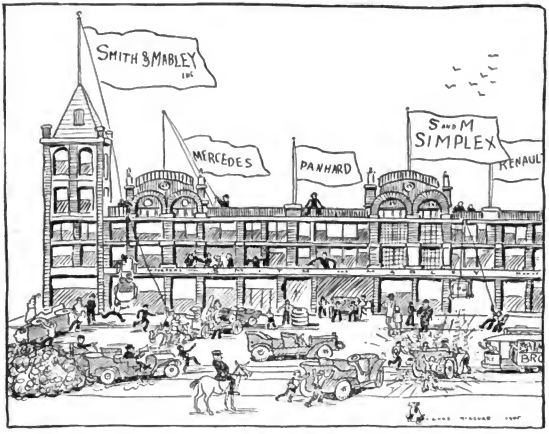
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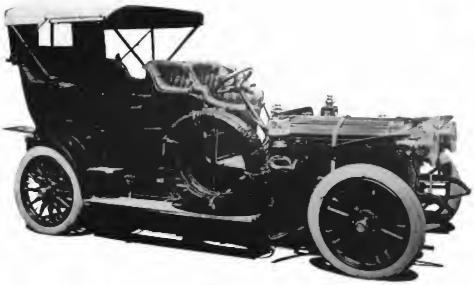
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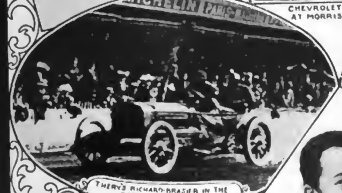
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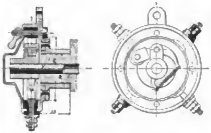
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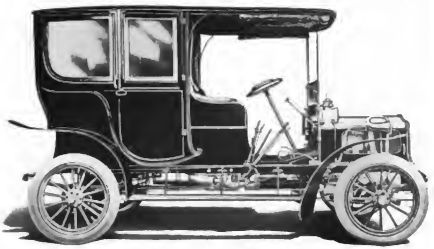


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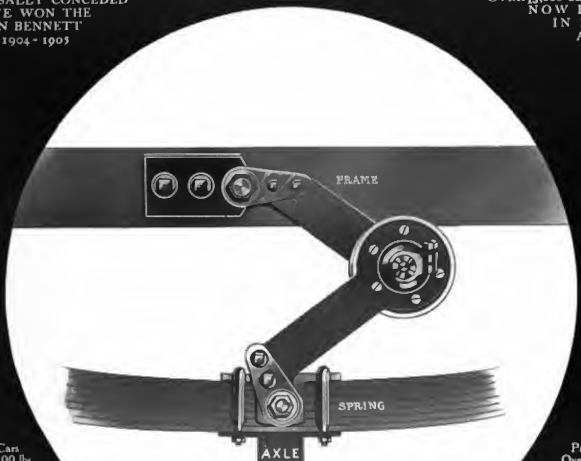
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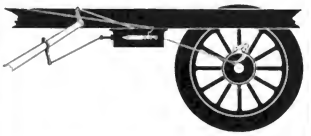
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FROM HELL GATE TO GOLDEN GATE

The four cylindered air-cooled Frayer-Miller car entered in the Long Branch Reliability, Fuel and Non-Stop run by the Oscar Lear Automobile Co., of Columbus, O., started Monday, August 21st, at 12:00 a.m. and continued until Sunday, August 27th, at 3:33 p.m., making on a course between Seabright and Sea Girt, N. J., a continuous mileage of 3,202 miles, equivalent to the distance from New York to San Francisco, in 6 days, 15 hours, 24 minutes.

This car did not stop its engine from August 21st, 12:00 a.m., until Wednesday, August 23d, at 11:13 a.m., being 59 hours and 4 minutes, during which time it covered 1,288.3 miles. This stop was caused by a pebble in the carburetor pipe.

This car was then run the remainder of a lap and one entire lap, making 74.3 miles in 2 hours, 4 minutes.

The carburetor was then cleaned and the gasoline pipe was soldered and the engine was again started at 2:40 p.m. Wednesday, August 23d. The engine did not stop from that time until the close of the run, Sunday, August 27th, at 3:33 p.m. During this time the car made 1,866.4 miles in 96 hours, 53 minutes.

The above is compiled from observers' reports duly filed with the race commission and attested to under oath by each member of the commission.

During this run the car used but 211 gallons of gasoline and ten gallons and one quart of lubricating oil, an expense of less than $60. On each trip three or more people were carried, an average expense of about $20 per head for three people, whereas the railroad expenses would have been for the same distance over $100 per head.

The run clearly demonstrates that were a national highway constructed from coast to coast four people in a Frayer-Miller car would without difficulty cross the continent in less than six days at one-sixth the expense of railroad travel and in practically the same time.

Although the Frayer-Miller car used but ten gallons of lubricating oil in 3,202 miles it stopped at the completion of the run after 96 hours' steady running without one murmur, being cool and in splendid shape.

In the run the car made over 7,000 turns, the road was very rough in spots, much of the progress was through towns necessitating slow speed and yet an average speed of slightly over twenty miles an hour was maintained. All sorts of weather were encountered. The roads, the weather and in fact every condition proved such as would be encountered in a run from the Golden Gate to Hell Gate.

In over three thousand miles of touring under all conditions the motor of the Frayer-Miller car was never in distress except when a stone caught in the carburetor, stopping the flow of gasoline. The drivers, Lee Frayer and F. E. Muscovecs, who were behind the wheel alternately for the entire distance, did not worry for one moment about the motor driving along steadily as day after day was added to the score. In the six days and fifteen hours the policemen along the course had no reason to complain of the speed of the car which was driven rather for endurance than speed.

In the early hours of the final day of the run one lap of 37.1 miles was made in one hour 18 minutes without trouble, showing the splendid condition of the motor.

The run is a triumph in many ways for air-cooled cars of all sorts and especially for the Frayer-Miller. It proved beyond doubt that water is a luxury for cooling motors, as air is cheaper and more plentiful. Air alone cools the Frayer-Miller and air cools it right as was demonstrated in this run.

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The advertising pages of this issue of Motor should be so carefully read as the text pages, because they are its readers' *information bureau*. If you wish to buy a motor-car, you will find the standard makes advertised in Motor. If you wish tires, lamps, motor-car accessories, etc., you will find only the standard makes of anything represented in Motor's advertising pages. Never hesitate to write to advertisers for more complete information than the advertisements contain. You incur no obligation, if you do. And when you do, kindly mention Motor.

For information about anything not in Motor, write us and we will see that you are informed.

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MOTOR BUREAU

A Practical Plan for the Sale and Purchase of Second-Hand Cars

Though many intending buyers of second-hand cars defer purchasing till spring, there are several advantages in buying in the autumn or early winter.

First, the buyer had time to get acquainted with his car before putting it to serious service.

Second, there is ample time for the mechanical overhauling, painting, etc., probably required, and the buyer has the advantage of being able to look after the work, which is not the case with a car overhauled before purchase. The repair shops are swamped with work in the spring, and an early start insures against loss of part of the touring season.

Third, the fall buyer is assured that his car has not suffered deterioration by being carlessly laid up through the winter.

MOTOR BUREAU assists buyers and sellers by listing cars offered for sale and by sending prospective buyers particulars of all listed cars likely to fill their requirements. A fee of $1 is charged in either case, which entitles the payer also to a 20-word "want" or "for sale" advertisement in MOTOR.

Buyers wishing cars inspected, tested, or overhauled under expert supervision are referred to Herbert L. Towle, consulting engineer of MOTOR BUREAU, who does this work at a fair rate for time spent. Mr. Towle's advice is given solely in the interest of the purchaser, and is confined to used cars only.

Further particulars may be had by addressing MOTOR BUREAU, 1789 Broadway, or Herbert L. Towle, 150 Nassau Street, New York.

IF YOU WANT TO SELL OR WANT TO BUY A SECOND-HAND CAR

Fill out the coupon below and send it with $1—at our risk—to

MOTOR BUREAU, 1789 Broadway, New York City.

SELLERS

should also give a description of the car for sale, including full particulars as to age, model, running qualities, general condition, and all other necessary details.

FILL OUT—TEAR OUT—MAIL TO-DAY

Motor Bureau,
1789 Broadway, New York:

Enclosed find $1, for which please enter on your list the car described on the sheet attached hereto. I understand that you will without additional charge give this car a 20-word "For Sale" advertisement in MOTOR.

Name.....

Address.....

BUYERS

Should also give particulars as to whether gasoline, steam, or electric is preferred, whether the car is to be used on good or bad roads, for city use or for touring, and other details necessary to selection.

FILL OUT—TEAR OUT—MAIL TO-DAY

Motor Bureau,
1789 Broadway, New York:

Enclosed find $1, for which please quote me such cars on your list as seem to satisfy the requirements noted on the attached sheet. I understand that you will without additional charge give me a 20-word "Wanted" advertisement in MOTOR.

Name.....

Address.....

Registration Bureau

For Chauffeurs and Mechanics

WE CAN HELP

anyone looking for a position as chauffeur or mechanic. We register you and assist you to find the position you are looking for.

All you have to do is to send us $1.00 and we will send you a registration blank to fill out. This also entitles you to an advertisement in MOTOR. Address,

Motor Registration Bureau

1789 Broadway, New York

OWNERS, FACTORIES AND GARAGES

Furnished with lists of competent men of every description.

Second-Hand Cars for Sale

Under this heading second-hand cars are advertised for sale at the rate of five cents a word, cash in advance. These columns are open to dealers as well as to owners of private cars. If you have a car for sale, you can reach more prospective purchasers by a "Motor Messenger" in Motor than through any other American medium.

CLEARING SALE

Highest Class—Lowest Prices

1905 Olds tourabout	$900
$1,200 Ford, side entrance tonneau car	750
$4,800 Peerless Limousine, like new	2,300
$4,000 20-H. P. Decauville; top, etc., swell	1,500
5 Cadillacs, choice	$350, 400
$2,000 Haynes Apperson surrey	350
$2,000 Dernicoach Matheri	1,000
$4,500 Walter, 24 H. P.	1,100
15 H. P. Panhard, side entrance	2,500
24 H. P. Pope Toledo, 4-cylinder, practically new	1,650
Steam delivery wagon	750
Olds delivery wagon	500
1904 White Steamer, complete	750
100 others.	

Broadway Auto Exchange

137 to 143 West 48th Street, New York

MODEL D, 1904 White Steamer in first-class condition; engine generator, tires, body and horn all in good shape; price, complete, $1,100. Clare Williard, Allegany, N. Y.

1095 Four-cylinder auto car; perfect condition; Hartford suspension; cape top; three gas lamps; price, $1,650. Hudson Auto Garage, Hoboken, N. J.

FOR SALE.—Motor Cycle; 1905 Yale Californian; As condition; no time to use same; price, $140. C. D. Weaver, 416 Tenth St., S.E., Washington, D. C.

FOR SALE.—7 Rochet Schneider, 1 Limousine, 1 side entrance; very good condition; recently overhauled by us, and in good running order. For further explanations inquire of Graf & Dunn, West End, N. J.

FOR SALE.— White touring car; 1905 model. Purchased last spring; in good condition and appearance; complete equipment of tools, extra parts, baskets, lamps and generator, etc.; run 2,650; rear tires new in July; will make 30-mile demonstration at any time for responsible purchaser; price, $2,000 cash. C. E. Palmer, Room 810, 71 Broadway, New York City.

FOR SALE.—Thomas "Flyer," 40 H. P., 1905. We will guarantee this one to be in the best of condition; cost $3,400; sell, $2,600. B. B. B., care Motor.

ONE Ford, 1903 model, in fine condition; Fisk tire, three extra castings; good bargain in light cart price, $250. Geo. A. Zook, Hagerstown, Washington County, Md.

PACKARD, Model F, 18 H. P., single cylinder touring car; three speeds; 30-mile maximum; spots, two lamps, headlight; first-class condition; price, $750. C. G. Meyer, Tifton, Ohio.

FOR SALE.—Decauville, two-cylinder touring car; basket, seats, lamps, horn, extra tires; car in good condition; price, $1,250. Geo. F. Woolston, 990 Eighth Ave., New York City.

FOR second-hand auto cars see A. G. Spaulding & Co., 31 West 42d St., New York City.

KNOX car, Model B, 1905; is in first-class condition and will bear the closest examination and severest tests. Would be willing to guarantee for a year to careful operator. Price, $850; or will exchange for smaller car and difference. C. A. Jones, Bristol, Va.-Tenn.

OLDS runabout double seat, price $75; and tonneau for Olds, price $125; good as new; have sold machine and have no use for them. O. T. Knode, Richmond, Ind.

FOR SALE OR TRADE.—1904 Haynes Apperson, 22-H. P. touring car, with canopy top, etc.; perfect condition; only run 1,500 miles; will take a runabout in exchange; any reasonable offer accepted. A. B. Scott, Marietta, Ohio.

FOR SALE.—One Geo. N. Pierce Great Arrow, Model 1905, with extra front and rear shoes and batteries, glass front and cape top; cost $4,500; must be sold on account of death of owner. Used only on Massachusetts roads less than 2,000 miles. Price, $3,000. Experienced and reliable chauffeur to be had. Fidelity Title & Trust Co., 321 Fourth Ave., Pittsburg, Pa.

1905 WHITE.—Thoroughly tested and so better than if just from shops; cape top; Weber autometer; baskets; extra inner tubes; guaranteed perfect all round; price, $1,400; a saving of $500 from agent's price. "White," 15 Broadway, New York City.

FOR SALE.—Model "C" Knox auto, with folding front seat; as good as new in every respect; used but very little; steering attached; full leather top; two extra Sampson tires, never used; six inner tubes; rear light, and other extras; $600 cash. Curtis Byrn, Lumber Co., Vesta and Liberty Aves., Brooklyn, N. Y.

JONES CORBIN CAR.—Nearly new; no other machine has the refinement of detail, thorough workmanship and honest quality; cost $1,800; will show at any time. Ralph S. Bruce, Madison Square Garden, N. Y.

FOR SALE.—Pope Tribune runabout; new this year; in perfect condition. What am I offered? Box 320, Brandon, Vt.

WINTON 1902; perfect condition throughout; all bearings and cylinders guaranteed like new; not scored for 1½ years during absence of owner in the South; tires, running gear and body like new; nine-inch Rushmore searchlight; square type generator; Splitdorf induction coils and Bosch Brampton chain; Jones speedometer; odometer; gradiometer; French horn on flexible tube; Gabriel horn (blows from exhaust); tonneau baskets; rubber covers and blankets; improved and strengthened frame and Winton patented full elliptic body spring; Delta oil lamps; steel connecting rods; improved pump rod; Lukenheimer light-feed lubricators on cylinders and crank case; lock washers under every nut, screw and bolt on the machine; etc., etc., etc. Will give $50 to any mile demonstration to responsible party. Price, $900. R. W. L., 158 West 46th St., New York City.

WHITE STEAMER FOR SALE.—1904 Model, canopy top, side baskets, acetylene lamps, two new tires; put in perfect condition and shipped from factory. P. O. Box 48, Newhall, Cal.

FOR SALE. — Knox 1904, two-cylinder, rear entrance touring car; canopy top; horn and full lamp equipment; car recently overhauled by Knox Automobile Company; tires in fine condition; two extra inner tubes; no reasonable offer refused. W. W. Bissell, 91 Main St., East Rochester, N. Y.

RUNABOUT of touring-car type; driven about 100 miles; is a 6-hp. hill climber; goes 25 miles an hour on the level; is in absolutely perfect order and practically new; must sell at once; car was made to order for wholesaler for $1,000; well worth the price now. Address 179 Sawtell Ave., Cleveland, Ohio.

DEMONSTRATING CARS.—Some having been run not more than three months; will sell at low prices, in order to make room for new cars; prices ranging from $210 to $750. Cameron Agency, 7 West 60th St., New York City.

WHITE STEAMER, 1905.—Better than new; tried and found perfect; has never been used; has canvas top; Rushmore and four other lights; tires never punctured. C. S. S. Miller, 12 Wall St., New York City.

FOR SALE.—Stevens Duryea runabout, 1904; perfect condition; new tires; will exchange. H. C. Williamson, 721 West 103d St., New York City.

TO SATISFY MORTGAGE.—Two 12-H. P. Locomobiles, almost new; one Franklin with two bodies; Haynes Apperson runabout with top. For full particulars address George H. Travis, 170 Broadway, New York City.

FOR SALE.—Indian motorcycle, $135; fine condition; grip control, compensating sprocket, all improvements, 1904; also motorcycle trailer, $25; fine condition; cost $85. Dr. H. J. Daniels, Norwich, N. Y.

1905 POPE TOLEDO, type VII; 30-H. P.; very little used, and in good as new; owner going abroad; will make a sacrifice in price. For full particulars write C. R. Hopkins, Beach House, Siasconset, Mass.

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AUTOMOBILE BARGAINS

GREAT BARGAINS in NEW and SLIGHTLY USED automobiles. We are the LARGEST DEALERS in NEW and SECOND-HAND automobiles in the United States. We buy, sell and exchange. We will sell your machine for 5% commission; absolutely no other charges whatsoever. WE at ALL TIMES carry in stock from 100 to 300 machines of various makes in second-hand machines. We mention below a FEW of our SPECIAL bargains. Complete bargain sheet sent upon request.

No. 861.	CLEVELAND, tonneau will seat five	$400
No. 805.	Late model OLDSMOBILE -	25
No. 910.	ORIENT buckboard -	150
No. 914.	LOCOMOBILE steamer -	125
No. 919.	LOCOMOBILE surrey -	225
No. 934.	Model "A" CADILLAC -	400
No. 939.	Brand new GENERAL -	600
No. 974.	WINTON Touring Car -	450
No. 975.	OLDSMOBILE touring car, like new - - - -	550
No. 982.	WAVERLY electric, in running order - - -	175
No. 531.	Model "A" CADILLAC -	375
No. 317.	LOCOMOBILE steamer, like new	200
No. 326.	PACKARD touring car -	500
No. 230.	OLDSMOBILE, newly painted	225
No. 943.	1903 WHITE STEAMER, like new - - - -	700
No. 302.	1904 WINTON touring c-r, with top and glass front - -	850
No. 1229.	1904 OLDSMOBILE -	350
No. 1262.	YALE touring car, cost $1,600, our price - - -	550
No. 1535.	1905 CADILLAC, only run 100 miles - - - -	700
No. 1534.	2 cylinder PEERLESS tonneau	450
No. 1311.	FORD tonneau -	400
No. 1409.	KNOX runabout, with folding front seat - - -	325
No. 1411.	GASMOBILE wagon -	450
No. 1517.	RAMBLER runabout -	275
No. 1526.	SPALDING runabout -	150
No. 1528.	AUTOCAR, with Square hood	500
No. 1533.	4 cylinder THOMAS with side entrance, best offer buys it.	

The above are only a FEW bargains. Complete bargain sheet sent upon request. REMEMBER, WE are the LARGEST DEALERS in second hand automobiles in the UNITED STATES. It will pay YOU to investigate our line before purchasing. If you are interested in any particular number, we would advise that you telegraph us, and we will hold same awaiting the arrival of your letter. Full description of any machine sent upon request.

Times Square Automobile Co.
164 WEST 46th STREET
2 Doors East of Broadway NEW YORK CITY

THE finest season of the year for riding is here, and why so late in the season should you buy a new car when you can buy a second-hand one from us for one-third its original cost, and then next season trade it as part payment for a new car, and get allowed as much if not more than you paid us for it. We are offering special values for this Fall Season and following are a few of the bargains:

CADILLACS, from - - -	$325 to $450
WHITE STEAM TONNEAU, complete with canopy top, - -	$725
OLDSMOBILE RUNABOUTS, -	$190 to $325
RAMBLER RUNABOUTS, -	$225 to $325
MOBILE RUNABOUTS, -	$190 to $225
WINTON TOURING CAR. -	$650
YALE TOURING CAR, like new, -	$550
QUEEN TONNEAU, -	$350
GASMOBILE, 3 cylinder, 12 h. p., -	$225
1905 UPTON TONNEAU, side entrance, 4 cylinder, - -	$2000
FRANKLIN, 4 cylinder Runabout,	$525
4 CYLINDER 1905 AUTO CAR, side entrance, - -	$1650
ROCHET-SCHNEIDER, side entrance, 4 cylinder, 18-22 h.p., -	$3200
FAIRARD TONNEAU, 4 cylinder, -	$1325

We have others on hand not mentioned here, and if you cannot come and look over our stock, write us and we will send you one of our complete lists. We are the largest dealers in second-hand automobiles in America, and it will more than pay you to call on us before purchasing elsewhere.

MANHATTAN STORAGE CO.
334 West 48th Street New York City
2 blocks from 42d St., 8th Ave. "L." 3 blocks from Subway.
'Phone, 4290—38th.

Second-Hand Cars Wanted

Under this heading wants of second-hand cars for cash or exchange are inserted at the rate of five cents a word. Since Motor is read by all dealers in second-hand cars as well as by more private car owners than any other motoring paper, a "Motor Messenger" in this column is more certain to obtain for you just the car you want than any other kind of advertising.

WANTED FOR CASH.—Gasoline car, French make only; prefer light car with ample power for touring (tonneau with or without top); must be in perfect condition; purchaser giving unexceptionable references requires country road demonstration and privilege of detailed expert investigation for week, etc. L. E. Palmer, Room 816, 71 Broadway, New York City.

WANTED.—A Cadillac touring car, 1904 or 1905 model, or some other equally as good. Edw. L. Gernaud, 211 N. Calvert St., Baltimore, Md.

WANTED.—A large commercial vehicle, cheap; must be in good order. Address Middlesex, Box 27, care of Motor.

WANTED.—A White Steamer in good condition; model of 1903; no dealers. Address Dexter, care of Motor.

WANTED.—Type 7, Searchmont touring car; state condition, price and factory number. Address "La Haste," care of Motor, 1789 Broadway, New York.

WANTED to purchase a car; Oldsmobile touring car $1400, or Franklin steam car, Model E runabout, list $850. J. H. House, Glenfield, Lewis County, N. Y.

For Exchange

A new Department care is to produce results. Every machinist has surplus accessories. Exchange them for something useful. Five cents a word.

EXCHANGE 16-H. P., side entrance, four-cylinder auto for single-seat runabout. I will give some one a bargain for a runabout. Lock Box 189, Howarden, Iowa.

WANTED to trade 16-foot gasoline launch almost new, for a second-hand gasoline runabout. W. F. Hurst, West Duluth, Minn.

BRAND-New latest model National cash register; cost $325; will exchange for small touring car; will give extra cash if necessary. E. B., 2543 Eighth Ave., New York City.

HORN in exchange for auto clock. E. S. S., care of Motor.

LAND.—Eighty acres in eastern Nebraska; will trade for an automobile; balance cash; will give full particulars upon application; good thing. M. L. H., care of Motor.

WANTED.—Land for an auto; give net cash price, exact location, income therefrom, taxes, and improvements; in fact, all about it. C. L. V. Berg, Le Mars, Iowa.

WANTED.—A first-class mare for a first-class, second-hand automobile—Black to the horses for me—15 hands, and good form; must be saddle horse. How much will you give me to boot? Auto cost me $2,400; used six months. Address Country, care of Motor, 1789 Broadway, New York.

HAVE fine stamp collection; will exchange for auto. Walter Robinson, Graham Court, New York City.

NEW Grant Steamer, 1904, with surrey head; a fine car turnout, and several others, that I will trade for land in the United States; give full description. A. M. Cain, Rockdouse, Ill.

KNOX runabout, 1904, Model C; remodeled lately; only run 1,000 miles; will trade for anything worth while; land preferred. Wm. G. Ernest, Ash Kum, Ill.

DOG, forty first prizes in bench shows, in exchange for auto; will give cash if necessary. A. S. W., care of Motor.

Instruction

Under this heading are inserted, at the rate of five cents a word, all advertisements of resident and correspondence automobile and motor boat schools, as well as notices of motoring books and other publications.

SCHOOL FOR CHAUFFEURS.—Ours is the original school of automobile instruction. Our unparalleled success has made many imitators. By careful, thorough individual work under personal supervision of the manager we make every student not only an expert chauffeur, but a thoroughly competent mechanic able to make repairs on any machine and to keep it at all times in perfect order. Satisfaction guaranteed. Long distance. West Side Automobile Transportation School, 309 West 41st St., New York, N. Y.

THE NEW YORK OFFICIAL AUTOMOBILE REGISTER AND TOURISTS' GUIDE for 1905 is the most comprehensive automobile publication issued in New York State, giving in a concise and intelligible form valuable information for automobilists.

It contains many minute descriptive touring routes covering 37,000 miles of good roads, with all the hotels and garages on the way; most carefully compiled from the latest Government and State surveys; verified as to distances, conditions of roads, and other details, by skilled road men and engineers; and is the most complete and reliable list of routes ever published; a gazetteer of cities, towns and villages in New York State, giving the population and designating whether the place is a money order, postoffice, or railroad station. It gives the best hotel in each town, with rates, where tourists may stop. It contains all automobile clubs in New York State and the United States and throughout Europe; also all automobile laws and ordinances. In addition, the book contains the number and owner of all automobiles, with description of machines.

Handsomely bound in crimson leather, 3¾ by 6 inches, 1½ inch thick. Price, $1. Hall Publishing Co., 150 Nassau St., New York City.

Miscellaneous Announcements

Under this heading we are prepared to print "Motor Messengers" for other than trade advertisers who have a real message to deliver to motor car and motor boat owners and users. The charge is only five cents a word.

ADVERTISERS.—Will J. B. H. and M. L. H., who advertised in the September number of Motor kindly call or send for letters at the office. Address Motor Bureau, Room 20, 1789 Broadway, New York.

Cars for Rent

Under this heading advertisements of motor cars and motor boats for rent are inserted at the rate of five cents a word. Every motorist having a car for rent should keep a "Motor Messenger" running in this column. Motor is the only motoring paper published that has any large circulation among that portion of the general public that does not own motor cars.

TOURING CAR FOR RENT.—Large private car by the hour, day or trip. James L. Magee, 1495 Broadway, Times Square, New York. 'Phone 1724 38th St.

AUTOS FOR RENT.—Day, hour or trip. M. J. Youle, 154 West 43d St., New York, or 'Phone 6782 38th St.

BOUTON MOTOR COMPANY.
AUTOMOBILE rental service; four-cylinder touring cars exclusively; garage and salesrooms. M. D. Bouton, president; Frederic A. Tarrant, treasurer; James H. Scott, superintendent. 'Phone 2052 38th St. Address 112 West 41st St., New York City.

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Garages

Under this heading notices of storage, repairing, electric charging, etc., are received from garages at the rate of fifty cents a word. A "Motor Messenger" in this column will bring your garage to the attention of more motor-car owners than any other publication.

STORING, repairing, electric charging; open day and night. Harlem Automobile Co., 139-163 West 127th St., New York City.

WANT to buy, sell, exchange? All makes and models almost new. Manhattan Storage Co., 334 West 44th St., New York City.

CARS stored and repaired at lowest reasonable prices. Terms: By the job or by the hour. All work guaranteed. Auto Transportation Co., 309 West 41st St., New York City.

STORAGE AND REPAIRS.—Automobiles for hire. Two At White Steamers, one 1904 Winton, one 1904 Locomobile for sale. Bradley Johnson Automobile Co., 120 East 64th St., New York City. 'Phone 3832 79th St.

PASTRES' AUTOMOBILE GARAGE, corner of Ocean Parkway and Sherman St., opposite Bader's Hotel. Telephone 831-8 South. Branch at 518 Sixth Ave., corner of 13th St. Telephone 494-8 South, Brooklyn.

AUTOMOBILE ARCADE.—Cars repaired and stored; best attention given to all contracts. F. C. Griffiths, manager, 49th St. and Broadway, New York City. 'Phone 2677 Columbus.

HEWITT MOTOR CO.'S GARAGE.—Largest and finest equipped storage and repair shop in New York City district just opened at 6, 8 to East Thirty-first St., New York, N. Y., by Hewitt Motor Co. Come and get acquainted.

LURIE'S AUTOMOBILE DEPOT, 187-198 Morris Ave., Bronx, New York, N. Y. Storage, expert repairing.

Motor Car Supplies and Accessories

Under this heading are advertised, at the rate of five cents a word, all kinds of motor supplies, parts and accessories. Motor is many widely read by car owners than any other motoring paper, and is therefore the best medium to which to advertise motor car supplies.

PERFECT AUTO CLOCKS.—Exquisite in design and workmanship. C. W. Little, 38 Cortlandt St., New York.

PROTECT YOUR AUTOMOBILE with a mud apron. A-Z Co., 462 Eleventh Ave., New York, N. Y. Call on or 'phone 2194 38th St.

HONEYCOMB radiators, undergurds, hoods, tanks, aluminum brazing, sprocket covers, repairing of all kinds. A-Z Co., 462 Eleventh Ave., New York. Call or 'phone 2194 38th St.

POWER INCREASES TWENTY PER CENT. timing four-Cycle valves to our diagrams. Testimonials from renowned builders. Copyrighted diagrams, $1. Motor-King, 162 Davis St., Bradford, Pa.

AUTOMOBILE TIRES
BOUGHT, SOLD AND EXCHANGED.

WE make a specialty of dealing in second-hand tires, and carry on hand, at all times, all makes and all sizes, as well as inner tubes. We can sell from 25 to 40 per cent. from the new prices. We allow a 25 per cent. discount on all sizes of new tires. Times Square Automobile Co., 184 West 46th St., two doors east of Broadway, New York City.

CADILLAC tonneau, lamps, etc.; Ford tonneau, body top, lamps, etc.; both newly painted and in good running condition; can be seen at S. P. O., northwest corner 60th St. and Broadway, New York City.

AUTO TIRES AT HALF PRICES

WRITE TO-DAY.

A. H. KASNER, 152 Church St., New York, N. Y.

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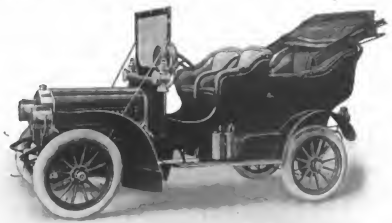
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THE AMERICAN TEAM

For the Vanderbilt Cup Race

Photos by Spooner

By Alex Schwalbach



BERT H. DINGLEY
Pope-Toledo



JOS. TRACY
Locomobile



ROBERT JARDINE
Royal Tourist



FRANK NUTT
Haynes



MONT. ROBERTS
Thomas

IF a short horse is soon curried, then a short course is soon storied, because the elimination race to select a team of five to later on represent USONA in the second race for the Vanderbilt cup, on Saturday, September 23, was only four times over the course, a gross total of 113.2 miles, instead of ten times over the course, or 283 miles. So that the race, or rather the test as the Commission prefers to call it, was only four-tenths of the whole main event which it is to follow, and naturally enough there was only four-tenths the interest, four-tenths the sport, and happily last, but not least, four-tenths of the usual crop of accidents and breakdowns.

The trials, which were originally scheduled to start at 5 o'clock, although it was not sunrise by the calendar until 5.43, were started at 5.30, under weather and road conditions that were simply perfect. What little wind there was came from the southwest, but there was a dim mist all over the landscape and towards the south the spires and turrets of Garden City looked like Venice rising from the sea, while the Wheatley hills from the north looked like islands floating in the air. The sun came out bright and warm, although the sky was overcast at 7.20, but the sun shone brightly again at 8 o'clock. The rainy weather conditions the first five days of the week were simply horrid, but made a change for the better Thursday night and, paradoxical as it seemed, the rain water and the oil mixed for once, and as a result the oiled roads were as smooth as sheets of dark brown emery cloth. It was a typical day in the early fall on Long Island. Light overcoats after sundown were a comfort. The surrounding country itself was at its best. Save for the brown sheaves of corn gathered in stooks in the fields and the bare brown earth and stubble and fields of goldenrod, everything else wore the deep full, dark green of summer verdure. For the first breath of the Frost King had not as yet blackened the beautiful flowers nor had his gorgeous pallette tinted the tree leaves with delicate but glorious gold, brown and red combinations which come later on. All the villa and the farmhouse grounds and gardens were aglow and aflame with their big beds of red geraniums and cannas and lofty flowering shrubs of hydrangeas bending low to the ground their big clusters of beautiful flowers just ripening and turning into a red-dish, purplish brown.

The weighing-in of the day before in the hands of Messrs. Riker, Birdsall and Miles was a delightful bit of *dolce far niente* for the press men who had assembled at the announced time at 10 a.m. at Townsend Albertson's scales on his one-hundred-and-fifty-acre farm in Albertson. Procrastination, a fatal and chronic trouble of our American makers, delayed the weighing in from 11 o'clock in the morning, when the Christie was the first car to be unofficially weighed, until 7.30 p.m., when by the light of stable lanterns the White was weighed and its brakes tested. The page of mechanical briefs of the cars tells elsewhere the varying weights of the contestants and other details in full.

Order of Finish	Name of Car	Motor Power	Driver	Time of Start a. m.	Time 1st Round a. m.	Time 2nd Round a. m.	Time 3rd Round a. m.	Time Finish a. m.	Elapsed Time for Distance (113 1-5 Miles)
									H. M. S.
First	**Pope-Toledo, No. 2**	**50**	**B. F. Dingley**	5:32	5:59:58	6:31:05	7:04:40	7:32:50	**2:00:50**
Second	**Locomobile, No. 5**	**90**	**Jos. Tracy**	5:38	6:09:27	6:40:40	7:10:36	7:39:49	**2:01:49**
Third	**Royal Tourist, No. 7**	**38**	**Robert Jardine**	5:42	6:16:44	6:50:05	7:25:41	8:01:18	**2:19:18**
Fourth	**Haynes, No. 1**	**50**	**Frank Nutt**	5:10	6:05:38	6:44:23	7:19:58	7:53:32	**2:23:32**
Fifth	**Thomas, No. 8**	**60**	**M. Roberts**	5:44	6:14:53	6:51:15	7:28:05	8:13:40	**2:29:40**
Sixth	Christie, No. 6	60	Geo. Robertson	5:40	7:30:37	8:03:15	Race	called	off.
Seventh	Pope-Toledo, No. 12	75	H. H. Lytle	5:48	6:16:44	. .	. .	. .	. .
Eighth	Franklin, No. 9	60	W. F. Winchester	5:46	6:22:46	. .	. .	. .	. .
Ninth	White, No. 4	40	W. C. White	5:36	6:43:52	. .	. .	. .	. .
Tenth	Matheson, No. 3	40	R. Mongini	5:34	. .	. .	. .	. .	. .

Average time of the winner 56½ miles per hour, Heath's average last year 52.07 miles per hour



THE WINNING POPE-TOLEDO. BERT DINGLEY DRIVING ON THE JERICHO TURNPIKE GOING 70 MILES AN HOUR

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New Yorkers have the modern habit of turning night into day, and the night before the race was no exception. Mineola might then be well named Bedlam, and if you throw in tent-tents, Jericho and Gabriel's horns ad lib you have the whole story. The Long Island Automobile Club camped out in tents with blazing log campfires at the starting point; all their guests met with a cheerful reception both inwardly and outwardly, their liquid demonstration being overwhelming, and every departing visitor was handed a large, white paper box inscribed "Midnight Lunch." It contained dainty sandwiches, cake, cream cheese and crisp crackers, raw tomatoes, pepper and salt, and for dessert sponge cake and Bartlett pears, all neatly done up in waxed papers and Japanese napkins.

Motor's good and original suggestion to place the starting and finishing points at Mineola was adopted, and as a consequence over five thousand spectators gathered at that point to view the race, over six hundred cars being parked there alongside the course. The view of the course from the double-decked press box and grandstand both ways was magnificent. The contestants, as they appeared in sight from New Hyde Park, dashed down and up the rolling grades of the homestretch like huge swallows skimming the earth, and after they passed the grandstand through the narrow, crowded aisles of people the same performance was repeated in the reverse direction.

The announcer's details of the race from the various telephone points on the course came so rapidly as to be almost a continuous performance. The start itself was not an exciting one. None of the cars got away to what might be called a good start. In fact, the Christie had to be almost pushed over the tape, owing to inability to crank it off. Lytle had his brake jammed on, and White, in his eagerness to get the pressure of his head of steam, threw open his throttle so wide as to break his toggle joint.

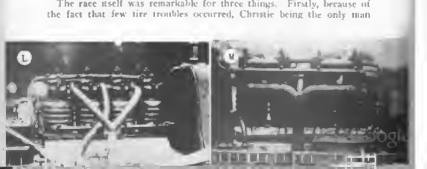
There was a great lack of applause for the cars and drivers at the start, even the press men who led the applause last year being too much occupied with their data to give the drivers the glad hand, but there was more general interest taken in the race throughout, lap by lap, and in the records of the announcers, which shows that we have learned to appreciate road racing, but it might also be possible that the small crowd warmed up better this year because the day itself was warmer than last year.

The warning signals were most excellent. The markers on the course who were always in sight of one another displayed warning flags of red and yellow, reversing the rule, however; for while a red flag meant danger to the public, it meant to the drivers of the cars that the road was clear, and the yellow flag, which meant safety to the public, meant danger to the drivers; besides that all the drivers had printed cards with these facts on their dashboards in front of them, so that they would not get these inverted signals mixed up.

The huge grandstand presented a beggarly array of empty benches, as was anticipated by those in the know, but which will not be so on October 14. Society was not very well represented, and what little there was was not clad sartorially perfect. It would seem as if the small female portion of society present had used the occasion to display their old duds and appear in gay colors at a daybreak function, when street and walking costumes should have been in order.

The management of the race was most excellent and the same may be said of the timing with one exception. Dingley's time for the first lap was announced as being 25 minutes and 58 seconds. A dozen good watches and expert timers in the press box and hundreds at the finish made this time as 27 minutes and 58 seconds. An objection was at once made to the officials, but without avail. The press men decided that they would announce their own time as being correct, but not officially, denouncing the announced time as being a gross and palpable error. The self-constituted authorities on timing, the Chronograph Club of Boston and the Timing Club of New York, should bear in mind that timing, like Cæsar's wife, should be above suspicion. After the race was over the timers decided in some way that their first announcement, after all, was wrong, and gave out the correct time as announced by the press men. In last year's race some trouble occurred at the beginning between the press men and the timers about the method of timing and the method of announcing, hence it does seem before the big race itself occurs that the official timers should hie themselves to a bicycle road race and witness the timing and placing of 150 starters who come over the finishing tape in bunches of six, eight and ten, all of which are correctly timed and placed. It seems incredible that any body of men could make an error of two minutes in announcing the official time of a race. Variations of from one to three-fifths of a second between individual timers might be expected, but the majority of timers should and must agree upon some one time to make the thing accurate and of value.

The race itself was remarkable for three things. Firstly, because of the fact that few tire troubles occurred, Christie being the only man





who had tire troubles—and his were undoubtedly caused by using tires that were not pumped up hard enough. In fact, he was looking around for a pump before the start. Secondly, because punctures were unknown, whereas in last year's race over a course that was undoubtedly salted with nails and glass, punctures were frequent, but thirdly and lastly, after all the great feature of the race was the triumph of the three touring cars and the regularity of their times over the course, although the big Locomobile racer shared in this regularity, but then it must be conceded that the Locomobile racer is not a freak, it being a heroic reproduction of the touring car.

The winning Pope-Toledo is classed by its makers as having fifty motor power, and therefore comes within the scope of a touring car. It is true that the course this year is faster than last year's, because it is without controls. A control means a slowing up and a stopping to get into the control, and it means a slow start to get out of the control, besides a loss of time before headway is again acquired.

A reference to the timetable of laps will show just how regular the cars ran over the course, three of them showing an actual improvement, instead of falling off, as the trial neared the end:

	1st.	2d.	3d.	4th.
Pope-Toledo	27:58	31:07	33:35	28:10
Locomobile	31:27	31:13	29:56	29:13
Royal Tourist	34:44	33:21	35:36	35:37
Haynes	35:38	36:45	35:35	33:34
Thomas	30:53	30:22	36:50	45:35

The race was officially declared off at 8:14, although at that time Christie was still running on the course and the first five had finished, the others being out of it. Jardine's upset in the woods on the Guinea road was a lucky one indeed, and might have cost him his car's place on the team. It demonstrates, however, just what a touring car can stand as opposed to a frail contraption such as racing freaks are.

A rose by any other name would smell as sweet; abroad the Richard-Brasier scoops in everything, and possibly the fact that the Pope-Toledo is a car with a hyphenated cognomen may account for part of its victory in the test. The test itself was originally hoodooed by thirteen entries, but that was broken when only ten cars started.

The two most dramatic features of the trial, after all, was the way in which Lytle, on the Pope-Toledo, passed Jardine in front of the grandstand on the first lap, and the anxiety on the last lap after Dingley had finished first, to know whether Tracy, who led him four seconds on the third round, but who started six minutes later, would beat him out on time. Slowly the six minutes were counted off, and it became apparent then, just as Tracy hove in sight from New Hyde Park, that, of course, he could not beat Dingley out, the interest then centering to know how much Dingley had beaten him, which was exactly 59 seconds.

Dingley led in the first round, followed by Tracy, Roberts, Jardine and Nutt. In the second round Dingley led again, the others in the same order; in the third round, however, Tracy was first and Dingley second, the others still in the same order. In the fourth and last round Dingley led, Tracy second, Jardine third, Nutt fourth and Roberts fifth. Tracy and Nutt did the four laps without stopping, Dingley stopped for a moment or two on the third round with some ignition and carburetor trouble. Roberts dropped pieces of the hard rubber off his battery in front of the grand-stand, indicating ignition trouble.

In the list of the "also rans" the Christie, which finished two rounds, was out because of tire troubles, Lytle, on the big Pope-Toledo, broke the cross member off his frame which carried the engine, and White, on the steamer, broke two joints in his universal shaft, besides having water trouble. The big air-cooled Franklin, of Winchester, cast a belt out of the universal joining the gasoline tank and caused it to leak, while the Matheson had some lubricating trouble which caused the piston to stick in the cylinder.

Dingley averaged 56.60 miles per hour, Tracy, 53.75, Jardine 48.70, Nutt, 46.24, Roberts, 45.50. Dingley averaged per mile, 1 minute 4.05 seconds, Tracy, 1, 4.57; Jardine 1, 18.85, Nutt, 1, 19.05; Roberts, 1, 19.33; while both Dingley and Tracy beat Hedley's average speed per hour of last year, which was 40.52.07.

KEY TO ILLUSTRATIONS

A—Jerusho Turnpike, Looking from the Point Shard to wards Mineola. B and C—Royal Tourist Motor, Inlet and Exhaust Side. D and E—Haynes Motor, Inlet and Exhaust Sides. F—The Royal Tourist Nearing the Finish of the Last Round. G—The Six-cylinder Thomas Going at Top Speed on the Turnpike. H—The Six-cylinder Pope-Toledo Lytle Coming Just Before the Mishap. I—The Christie, Which Lost a Tire Through Tire Trouble. J—The Locomobile (No. 31 and the White Racer in Search of Gas. K—The Haynes Which Won Fourth Place. L and M—Pope-Toledo Inlet and Exhaust Sides. N and O—Haynes Motor, Exhaust and Inlet Side. P—Miss Lytle Driving Through Woods Turn.

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MECHANICAL BRIEFS OF THE COMPETITORS

THE conditions governing the competition for the William K. Vanderbilt, Jr., cup provide that the cars entered must not weigh more than 2,204 pounds (1,000 kilograms), and when equipped with a magneto fifteen pounds is allowed, although all magnetos nowadays weigh more, the average weight of a magneto being about 25 pounds. The cars are also weighed empty, supplies of gasoline and water being drawn off before weighing. Nor shall the cars entered weigh less than 881 pounds, and they must have a seating capacity for two passengers side by side, whose weight must be at least 132 pounds each.

The cars, in each and every one of their parts and equipments, must be entirely constructed in this country, and as not more than five cars shall represent any one country, in the event of there being more than five entries from the United States the racing board of the American Automobile Association shall decide which of the entries may compete in the cup race.

Of the twelve American entries nine were of the vertical cylinder, water-cooled gasoline type, two of them, the Premier and Franklin, being air-cooled, and one, the White, a steam car with a flash generator system and a two-cylinder compound engine. The Thomas and Pope-Toledo No. 12 have six cylinders, and the Franklin eight cylinders, all arranged vertically and longitudinally.

All the cars were officially weighed on Friday on Townsend Albertson's Howe platform scales in his farmyard at Albertson, just north of Mineola. The official records were then and there filed with the Commission of the A. A. A. and the mechanical data collected and subscribed to by the representatives of the car makers, all of which is given in full in the separate forms which follow:

No. 1. Haynes, 50 m. p.

WEIGHT, 2,198 pounds; wheel base, 106 inches; tread, 56 inches; Diamond tires, 34 x 4 in. front and 34 x 4½ rear; Haynes sprocket and roller pinion drive; ratio of motor speed to one turn of road wheel on high gear, 2 to 1; one rear internal and external hub brake; ignition by jump spark from dry cells or storage battery; gasoline capacity, 28 gallons; water capacity, 6 gallons; cooler, cellular with fan; steering gear, Federal; change speed gear, Haynes individual clutch; reverse gear, pinion; speeds, three forward and reverse; pressed steel frame, wood reinforcements; 5-in. bore, 6-in. stroke.

No. 2. Pope-Toledo, 50 m. p.

WEIGHT, 2,198 pounds; wheel base, 100 inches; tread, 54 inches; Diamond tires, 34 x 3½ in. in front and 34 x 4½ in. in rear; double side chain drive; ratio of motor speed to one turn of road wheel on high gear, 35—50 in transmission, to 38—36 in sprockets; two hub brakes and one on power shaft; ignition, jump spark from storage battery; gasoline capacity, 18 gallons; water capacity, 6 gallons; water cooling, radiator and centrifugal pump; steering gear, worm and segment; change speed gear, sliding; reverse gear, sliding; speeds, three forward and reverse; pressed steel frame; 6-in. bore, 6-in. stroke.

No. 3. Matheson, 40 m. p.

WEIGHT, 2,188 pounds; wheel base, 100 inches; tread, 56 inches; Diamond tires, 34 x 4 front and 34 x 4 in. rear; double side chain drive; ratio of motor speed to one turn of road wheel on high gear, 1 to 1.85; water-cooled brakes on sprocket shaft; ignition, make and break from low-tension magneto and batteries; gasoline capacity, 12 gallons; water capacity, 6 gallons; water cooling by honeycomb radiator; steering gear, worm and sector; change speed gear, sliding; reverse gear, pinion; speeds, three forward and reverse; pressed steel frame; 5-in. bore, 6-in. stroke.

No. 4. White Steamer, 40 m. p.

WEIGHT, 2,184 pounds; wheel base, 132 inches; tread, 52 inches; Diamond tires, 30 x 3½ front and 34 x 4½ inches rear; shaft drive; ratio of motor speed to one turn of road wheel on high gear, 1 to 1½; flanged water condenser; brakes, band and internal on rear wheels; gasoline capacity, 30 gallons; water capacity, 30 gallons; steering gear, worm and segment; link motion reverse; wooden frame, steel flitch plates.

No. 5. Locomobile, 90 m. p.

WEIGHT, 2,204 pounds; wheel base, 109 inches; tread, 54 inches; Diamond tires, 34 x 3½ front and 34 x 4½ inches rear; double side chain drive; ratio of motor speed to one turn of road wheel on high gear, 1 to 3; brakes on jack shaft and on rear wheels; ignition, make and break by low-tension magneto; gasoline capacity, 37 gallons; water capacity, 9½ gallons; water cooling, cellular; steering gear, worm and sector; change speed gear, sliding; reverse, sliding; speeds, three forward and reverse; Hartford suspension; pressed steel frame; 7¼-in. bore, 7¾-in. stroke.

No. 6. Christie, 60 m. p.

WEIGHT, 2,012 pounds; wheel base, 96 inches; tread, 57½ inches; Goodrich tires, 32 x 4. Front wheels manganese bronze, rear wheels artillery; drive, direct on front wheels; ratio of motor speed to one turn of road wheel on high gear, 1 to 1; two brakes on engine clutches; ignition, jump spark from batteries; gasoline capacity, 18 gallons; water capacity, 12 gallons; water cooling, Christie tubular fin in radiator; steering gear, rack and pinion; change speed, sliding gear on differential; reverse gear, sliding gear to intermediate shaft connecting differential; speeds, two forward and reverse; pressed steel frame, helical springs; 6¼-in. bore, 6¼-in. stroke.

No. 7. Royal, 38 m. p.

WEIGHT, 2,190 pounds; wheel base, 110 inches; tread, 56 inches; Diamond tires, 34 x 4½ inches; shaft drive; ratio of motor speed to one turn of road wheel on high gear, 29 to 48; two foot brakes on propeller shaft and hand brake on rear axle, all internally expanding; ignition, jump spark from storage batteries; gasoline capacity, 50 gallons; water capacity, 6 gallons; water cooling, Whitlock radiator and centrifugal pump; steering gear, worm and segment; change speed gear, sliding; reverse gear, sliding; speeds, three forward and reverse; pressed steel frame; 5-in. bore, 5½-in. stroke.

No. 8. Thomas, 60 m. p.

WEIGHT, 2,180 pounds; wheel base, 122 inches; tread, 56 inches; Goodrich tires, 32 x 3½ front and 32 x 4 inches rear; double side chain drive; ratio of motor speed to one turn of road wheel on high gear, 7 to 8; brake, one emergency; ignition, by jump spark from storage batteries; gasoline capacity, 30 gallons; water capacity, 7 gallons; water cooling, honeycomb; steering gear, segment and worm; change speed gear, sliding; reverse gear, sliding; speeds, two forward and reverse; Hartford suspension; pressed steel frame; 5¾-in. bore, 5½-in. stroke.

No. 9. Franklin, 60 m. p.

WEIGHT, 2,182 pounds; wheel base, 128 inches; tread, 48 inches; Diamond tires, 36 x 3½ front and 36 x 4 inches rear (Franklin has two four-cylinder engines coupled together); ratio of motor speed to one turn of road wheel on high gear, 1½ to 1; brakes, Raymond; ignition by jump spark from Witherbee storage battery; gasoline capacity, 26 gallons; air cooled; steering gear, Brown and Lipe; change speed gear, sliding; reverse gear, sliding; speeds, two forward and reverse; Hartford suspension; three-ply laminated wood frame with double 5-16 round nickel steel truss with center bearing strut and adjustment turnbuckle; 5-in. bore, 5-in. stroke.

No. 12. Pope-Toledo, 75 m. p.

WEIGHT, 2,204 pounds; wheel base, 103 inches; tread, 54 inches; Diamond tires, 32 x 2½ front and rear; double side chain drive; ratio of motor speed to one turn of road wheel on high gear, 1 to ½; shaft brake; ignition, jump spark from storage battery; gasoline capacity, 30 gallons; water capacity, 6 gallons; water cooling, condensing system; steering gear, worm and segment; change speed gear, sliding; reverse gear, sliding; speeds, three forward and reverse; pressed steel frame; 6-in. bore, 6-in. stroke.

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THROUGH THE PINE TREE STATE

MOTORING AND CAMPING IN MAINE

By Ezra H. Fitch



EVERY year for many years I have been in the habit of devoting my vacation to hunting and kindred sports, and, since I first owned a motor car, four years ago, the idea has lurked in my mind of attempting a combined motoring tour and camping, hunting, and fishing trip. However, it was not until this year, when I bought a White steamer, that I felt that I had a vehicle adapted for the arduous service which such a tour would necessarily involve. As good companionship is one of the first requirements of such a tour as the one I had in mind, I invited Augustus Post, A. T. Edmundson, N. Lazarnick, and R. H. Johnston to accompany me, and no second invitation was necessary, the first two further offering to drive their Whites on the tour.

Now, while I had many times hunted and fished in Maine, I knew absolutely nothing about the roads, and I could learn nothing from the sportsmen who came into my office. The average mortal who goes to Maine to hunt, travels on the railroad as far as it will take him; then he gets into a buckboard with a trailer behind carrying his canoe, and rides possibly five miles to the nearest stream or lake, where he enters his canoe with his guide and paddles over the innumerable waterways to such hunting and fishing grounds as he may wish to visit, with an occasional portage from the head waters of one stream to those of another. That is why sportsmen know nothing of the roads and practically nothing of the towns. Our party resolved to be prepared for any contingency, and we talked over the plans at great length. My partner, David Abercrombie, a civil engineer by profession, gave us several talks on how to build bridges—this, in the event that we might find no bridges where there ought to be in the Maine wilderness.

With the determination of a "do or die" spirit our party of five assembled in Portland on Friday, August 25th. The three motor cars in which we were to make the trip arrived on







A REAL, THOUGH DIMINUTIVE TROLLEY









A NATIVE LAD'S PET—A TAME FOX

the boat from New York in the afternoon, and we at once fell to work to load them with our equipment—no mean task, as will soon be disclosed.

First of all, there was the "road building" equipment. This consisted of a block and tackle, with 400 feet of five-eighth inch rope, four axes, a shovel, a mattock, and a crowbar. These implements, together with two extra springs and a number of small extra parts, was loaded on Mr. Post's machine, which we immediately dubbed the "wrecking car." In each car was carried an extra shoe and several inner tubes. Distributed among the three cars were four silk tents, an aluminum cooking outfit for seven, a small stove which folded flat, a telescopic stove pipe, a folding "baker," folding lanterns, and numerous other small articles which would add to our comfort in camp. We also carried rifles and a complete layout of fishing tackle, not only for the purpose of sport, but also because we depended upon this equipment for a supply of fresh food. Also, each man had a canvas bag containing his kit—his sleeping bag, and a few extra articles of clothing, all of light wool.

It was dusk when this impedimenta was all stowed away in the cars. That evening we went as far as Brunswick (25 miles) where we thought it best to spend the night, because the acetylene lamps on Mr. Edmundson's car refused to work. The next day we continued by way of Augusta, Waterville, and Bangor, to Oldtown, where we put up for the night. The next morning we took on two guides. Not only were we to need their services in pitching camp, but because the laws of Maine provide that no non-resident shall fire a gun or build a fire unless accompanied by a licensed guide. At Oldtown we also took on a two weeks' supply of staple groceries. These consisted of coffee, sugar, flour, cornmeal, cereals, salt, beans, rice, evaporated cream, etc. Each of these articles was packed in a

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A FOREST ROAD OF MAINE

separate canvas bag and the small bags were then sandwiched one upon the other in heavy waterproof canvas bags, ten inches in diameter and two feet long.

From Oldtown we proceeded to Mattawamkeag. Up to this point our route had followed closely the line of the Maine Central Railroad, but here we left the railroad and proceeded due north toward Patten. From this time on every minute was eventful. On Sunday afternoon every young man in the sparsely settled section was out in a buggy with his best girl, and, needless to say, the horses cut up high jinks at the unusual sight of the cars. Fortunately, the road was without a turn for miles at a time so that the drivers could see us coming and literally "take to the tall timbers." There were no cross roads in this vicinity and, as a rule, the horsemen, seeing us from a distance, would drive off the road, unhitch their horses, tie them securely to the trees, return to the road, and watch us in open-eyed amazement as we skimmed quickly past them. We felt a particularly grave responsibility, as pioneers, to leave behind us a friendly disposition toward the motor car, and all along the route, if a horseman did not turn off the road, we would stop our machines, alight and lead the frightened animal past. Owing to such precautions as these, we were fortunate in not causing any upsets along the route, although, I must admit that several times we narrowly escaped causing such mishaps.

The whole of Maine had been suffering from a six weeks' drought. As a result, the woods were like so much tinder, and forest fires were raging on all sides. We had occasion to learn how fire persists under such circumstances. Coming through the woods we found a place which had evidently just been left by a party of campers who had not completely extinguished their fire. We spent fully half an hour in beating out the

A TYPICAL LUMBER CAMP





HUNTIN A MOTO



THE ANGLER, TRIUMPH



A LOG JAM



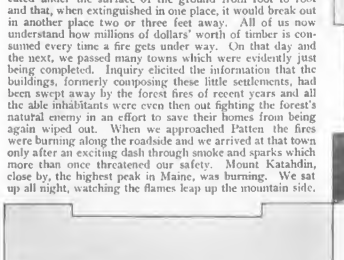
BRINGING THE CARIBO

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MAKING A CLEARING

smouldering embers. It seemed as if the fire was communicated under the surface of the ground from root to root and that, when extinguished in one place, it would break out in another place two or three feet away. All of us now understand how millions of dollars' worth of timber is consumed every time a fire gets under way. On that day and the next, we passed many towns which were evidently just being completed. Inquiry elicited the information that the buildings, formerly composing these little settlements, had been swept away by the forest fires of recent years and all the able inhabitants were even then out fighting the forest's natural enemy in an effort to save their homes from being again wiped out. When we approached Patten the fires were burning along the roadside and we arrived at that town only after an exciting dash through smoke and sparks which more than once threatened our safety. Mount Katahdin, close by, the highest peak in Maine, was burning. We sat up all night, watching the flames leap up the mountain side.



CROSSING LAKE TENISCONATA

a sight not soon forgotten, so impressive was the fire king.

Resuming our journey the next day, we soon came to a road which branched out toward the east, and we learned that the two or three steam runabouts, the only motor cars which had previously penetrated up to this point, had all taken this route which leads to Houlton and the more settled eastern portion of Maine. This eastern road was the only one shown on the cycle map which we had been following up to this point. However, we continued bravely on a direct route north and soon found ourselves in a country even rougher and wilder than we had traversed before.

"'S this 'n orternobeel?" asked a lumberman's wife when we stopped before her humble cottage to take in the beautiful vista of lake and of woodland which stretched before us. This question perhaps conveys an idea of the absolutely pioneer nature of our tour from that point until we reached the St. Lawrence River at Riviere du Loup. Resuming the narrative: near Masardis we for the first time camped out of doors, and so comfortably did we pass the night and so much did we enjoy the meals cooked over the camp fire, that all declared that we had no further use for hotels or farmhouses.

A few words regarding our procedure on reaching the camping grounds will be of interest. In the first place, a camp site was always selected near a lake or stream, as water is absolutely essential. Then all hands fell to with axes to clear a space for the tents and the machines. The motor cars were then unloaded, the guide who acted as cook immediately built his fire and commenced preparations for the evening meal, while the rest of us cut tent poles and tent pegs, put up the tents and built a crude table on which to spread the meals. By the time all this work was completed, the dinner would be ready and we ate our simple repast from the aluminum dishes with much more relish than we ever ate from Limoges china in New York's finest hostelries. After dinner we would sing around the camp fire and smoke our pipes for a while, and then were ready to crawl into our sleeping bags, which were stretched on the balsam boughs spread over the floor of the tent for that purpose.

Leaving our camp near Masardis, we continued on by



THE RESULT OF THE LOGGING SEASON

way of Ashland. When a few miles beyond Ashland, our road lay through a dense forest, where we had frequently to chop away trees which had fallen across the narrow road, and to cut out stumps which effectually blocked the passage of the machines. The road was a constant succession of ascents and descents, but ever making toward a higher level. For fifteen miles there was no sign of human habitation and when we once more came to a little hamlet, near Eagle Lake, it was as though we had come into an entirely different country; the people were all of French descent, and there was no one who spoke a word of English, except the parish priest. He told us that, from this point on, we would meet few, if any, English-speaking people and this later proved to be the case. The signs on the stores were in French and everything, even to the humble architecture, told that we had left English-speaking communities behind us.

(Continued on page 56)



A FOREST FIRE

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The Blue Ribbon of American Motoring

The Story of the Vanderbilt Cup.

By Chas. Quincy Turner.

THE Blue Ribbon? Certainly! That is what the Vanderbilt Cup is—an honor alike to its donor and to the winner; beneficent in its results. To do and to dare in any other sphere of human endeavor, even in the pursuit of the Quixotic, is accounted heroic. It is a singular problem of social idiosyncrasy that the initial contest for the Vanderbilt Cup, last year, an event throughly in the line of the practical, was made the occasion of a press torrent of demagogic abuse, far and wide. The old, old story: one newspaper starts abuse on erroneous data, or by reason of some narrow prejudice; and lest the others should be thought lacking in watching over the rights of the people (that nebulous phantom which each can claim to be the champion of, without committing themselves to anything), every rival joins in the hue and cry, and goes the originator one better, with cheaper claptraps, and wider mouthed fallacies; but you cannot fool all of the people all of the time.



THE "DONOR OF THE CUP"

Let me go back a moment to the origin of the trophy, which, in the future, may become as notorious as that "old mug," the America's Cup, which through fifty years of yachting contests our English sea rivals have failed to lift out of our grasp. Nobody now abuses that prize; that would be to run counter to popular feeling and national pride; yet the origin of the America's Cup was purely "sporty." It was "The Queen's Cup" of the Royal Yacht Club, given by the crown annually to promote yacht racing only. Yacht racing premises and develop the haulage power of the motor car, must, in the end, enure to the commercial advantage of every one; and there was no avenue so readily open to prove the motor car's power as that of public competition, and the emulation which would be sure to follow the establishment of a proper and much sought after prize, even though the winner of it might be open to the sneer that he was looking beyond the prize to the acquisition of trade.

Instead of getting recognition for commercial acumen or patriotic enthusiasm for his country's manufacture, Mr. Vanderbilt's objects and motives were, from the first, maligned and misrepresented. With the recurrence of the contest for the Cup this year, a recrudescence of the crop of perverseness is about due, and it is not untimely to anticipate them by an examination of their merits or demerits.

The gravamen of their arraignment was based first upon the point that the roads of Long Island were built and maintained at the public expense, and yet were monopolized for that day for the purpose of the race, and that "the rights of 150,000 people were shamefully disregarded." As a matter of fact 30 miles of road were monopolized for seven hours, and I should like to know in what year of grace 5,000 people ever went down the Jericho Turnpike in an hour, or in a month! Such exaggeration is its own refutation. I have seen the rights of 5,000 people an hour "shamefully disregarded" in the metropolis, and curiously enough it was when



wealth in its patrons and pleasure as the incentive to build and sail yachts—*ergo*, its base was to promote amusement. We won it in 1851, and it has done nothing else since but provide occasion to spend money on new yachts to defend it; each of them more useless than its predecessor, until the limit has been reached; and, after the races, the later contestants have followed one another to the junk shop as useless toys.

The origin of the Vanderbilt Cup, on the other hand, had its base in the brain of a member of a family whose unbroken efforts, through four generations, have been concentrated on the question of practical transportation in all its phases; to whom the coming of the motor has brought into the region of practical possibilities gigantic new forces, the experimental stages of which could not be fully tested except by inciting the mechanical and commercial co-operation of every manufacturer who was working along these various lines. The result would be, as he foresaw, of vital importance, not only to the great financial interests of railroad enterprise, but, beyond this, to the future of the entire commonwealth. Any triumph arising from object lessons in the capacity to cover space,



THE "CUP"

the great arteries, built at the public expense, had their traffic defeated for hours that the newspaper which made the charge against the races most vociferously might fill the streets with its bands and fireworks to further an object it was promoting. I do not remember that they then waxed eloquent upon the wrongs of the dispossessed. I am not quarreling with it for what it did. I sympathized with the object it had in view, but the rights of other people were ruthlessly subordinated just the same. Of course that gathering was under permit from the road authorities, but so was the Long Island race, and, of course, the whole charge was a bit of cheap bunconibe. There were no more rights trampled on in the Vanderbilt Cup race than there is in refusing to let coal wagons go through the park, though it does compel them to go a longer way round.

Another paper grew virtuous and indignant over the degeneracy of the times, and bemoaned the days as those "of bad sign when men throw away life for amusement or profit." I do not say that the accident in the race to which it was alluding was neither for amusement nor profit, for it happened to an amateur (can one forget that), but I

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GEORGE HEATH, IN THE WINNING PANHARD LAST YEAR

do say that, in order to make a profit out of the description of the scenes of carnage and war, no newspaper will hesitate to send its correspondents into the firing line of a battle, or into the pestilential zone of the military hospitals, so long as "copy" can be had.

Yet another paper waxed indignant at "hundreds of thousands of dollars being thrown to the wind." What wind? Not a cent of it but went back into trade sources in wages, in promoting inventions, which in the end will revolutionize social conditions, and work untold blessings on millions yet unborn.

Suppose the accident even did happen, which I do not admit, when the victim of it was "in search of amusement," what of that? Are we all to lie in bed between down covers, in order that we may not be injured when in pursuit of otherwise innocent recreation? It's against the fundamental laws of human nature, and no amount of press abuse or advice will ever alter it. We all take "dares" from our early boyhood up, and run risks in doing so; it is part of the inborn instinct of all healthy youngsters; and it will be a namby-pamby nation whose youths refuse to do it. Motoring is not nearly so risky as lots of other amusement for which nobody is reproved. Does not the climbing of the Alps and other mountains claim yearly its toll of victims? Is walking therefore wicked? I suppose if it resulted in accident it would come under the castigation of certain of the press whose lash was out for the "idle rich" motorist. Shall we cease to ride horseback because sometimes a horse will get its foot in a gopher hole and in stumbling the rider's ribs are broken? Shall we abandon yachting because the ignorant and unskilled sometimes pay the penalty of rashness? Shall we flay the motorist as a social leper "cutting a swath of death to make a gentleman's holiday," or for "throwing away life for profit," and load with honors, as heroes, the men who, in spite of all past experience, year after year lure crews to certain death in the Arctic region, in order that the leaders may write books for much money, if they return from their futile and useless quest for the North Pole?

But let us leave the vituperators to their baseless calumnies and feeble logic. Time will take its revenge, and the Vanderbilt Cup will justify itself as the Blue Ribbon of American motoring. Should it never be raced for again, it still would be the Blue Ribbon. It made a good start last year, when it brought to the front the fact that the product of America's motor cars, low powered, practicable, were to be depended upon, for of all the heavy, high motor power cars which started, only two survived to the finish. There was honor enough for the first round in the fight, and a most valuable commercial indicator. It was what the donor of the cup intended to induce, the handwriting on the wall, pointing out the direction of future efforts, and the lines along which, ultimately, a mighty fabric of manufacturing will be based; to the profit of hundreds of thousands engaged in the multifarious ramifications into which the trade runs, and to the ultimate evolution of lines of motor traffic which carry untold blessings into every corner of the land.



ALBERT CLEMENT JR. IN THE CLEMENT-BAYARD—SECOND

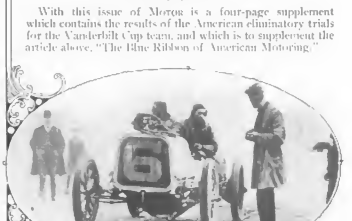
This year's racing will be far more valuable in its lessons than last year's, because it will enable comparisons to be made. The course will be located in the same district, modified as regards controls in favor of this year. What improvements, therefore, may result will be mainly due to better machines, more intimate knowledge of mechanism, simplicity in design, strengthening of parts, and increased resistance in tires. For the purpose of making these comparisons, an epitome on page 92 of the points of failure in the machines of 1904, and the proportions of the ten circuits which each machine covered, and when and why some of them were put out, will be found useful.

If the Vanderbilt contest and its successors, in addition to the unquestioned value as tests and as yearly marking-stones on the road to the goal of perfection, also give pleasure to those who delight to see an exhibition of endurance, nerve, pluck and skill, even in the manipulation of machinery, shall they forego it because there be those to whom it gives no corresponding emotion? I may propound for all such narrow-minded, envy-eaten critics, what Falstaff did for the propounders for him of a code of conduct with which he had no sympathy, "Shalt there be no more cakes and ale because thou art virtuous?" I trow the cakes and ale of motoring will last as long as human nature remains what it has been, in every nation which has been worthy of a place in the annals of the world.

In order that a team of five cars might be selected to represent America in the Vanderbilt Cup contest, eliminatory trials were held on Saturday, September 23d, over the same course as the main event will be run. The distance for the eliminatory race was 113½ miles, or four circuits of the course, which is 28½ miles around. The drivers and numbers of the twelve cars who drew for position were as follows: 1—Frank Nutt, driving a 50 m.p. Haynes, entered by Edward Haynes; 2—Bert Dingley, driving a 60 m.p. Pope-Toledo, entered by A. L. Pope; 3—Ralph Mongini, driving a 40 m.p. Matheson, entered by L. M. Palmer, Jr.; 4—Walter White, driving a 40 m.p. White, entered by R. H. White; 5—Joseph Tracy, driving a 120 m.p. Locomobile, entered by Dr. H. E. Thomas; 6—Geo. Robertson, driving a 60 m.p. Christie, entered by James L. Breese; 7—Robert Jardine, driving a 40 m.p. Royal Tourist, entered by E. D. Shurman; 8—Mortimer Roberts, driving a 60 m.p. Thomas, entered by H. S. Houpt; 9—W. F. Winchester, driving a 60 m.p. Franklin, entered by Col. E. H. R. Green; 10—Tom Cooper, driving a 40 m.p. Matheson, entered by C. W. Matheson; 11—Carl Fisher, driving a 60 m.p. Premier, entered by T. A. Weidley; 12—H. H. Lytle, driving a 90 m.p. Pope-Toledo, entered by A. A. Pope.

(Continued on page 92)

With this issue of Motor is a four-page supplement which contains the results of the American eliminatory trials for the Vanderbilt Cup team, and which is to supplement the article above, "The Blue Ribbon of American Motoring."



H. H. LYTLE WHO WON THIRD PLACE IN A STOCK POPE-TOLEDO

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THROUGH THE POCANTICO HILLS

BY HERBERT EVERETT.

WHEN you go touring in a motor car you see things from a point of view far different from the one you take when wheeling or driving. The exhausting grind of incessantly pedaling a bicycle any appreciable distance beyond the limits of the city, where the eye may feast upon things and scenes not in your everyday view, is certainly not conducive of appreciation, in the fullest measure, of what you may see; for the very effort brings not only physical but mental exhaustion inimical to sightseeing, and makes a trip awheel rather an athletic accomplishment than anything else.

And a drive behind a horse is but a limited thing at best. The distance you may travel from your starting point is measured by half the possible distance that the horse can travel in a day. Then, again, you are handicapped by its average speed, which at most will not be more than eight miles an hour while moving.

But in your motor car—the distance you may travel; the flexibility of speed you have at command, enabling you to go by places you do not feel interested in, in order to give longer time to dwell upon the beauties or interest of other spots; the physical exhilaration you may have with perfect physical repose; the ability to go uphill and down dale, through country which your sympathy for dumb animals would not demand of a horse, and your sympathy for yourself would not ask yourself to attempt to accomplish: all these, and a hundred and one other things, make the motor car as a means of going out into the country the ideal way. It turns you, who, perhaps, have been a faithful horseman or an enthusiastic cyclist, into an ardent motorist, and changes your point of view of the things you go out to see.

Heretofore, ere you became a motorist you have driven your horse twenty, perhaps twenty-five, miles in a day, and afterwards felt sincerely ashamed of the feat, because the day was hot, and the animal came in "dead beat." Or, peradventure, you have gone fifty miles out into the country awheel over beaten highways and byways, where grades are few and never heavy, avoiding the hills and mountains (where scenery abides) as you would eschew a viper, and you have at least reached home exhausted, but proud of your "century," though with but meager knowledge of the country you have passed through.

Perhaps you *have* been up into the hills and mountains where nature hides her choicest gems, the discovery of which is a "joy forever." Quite true, you have been up in the Pocantico Hills, that overlook the wonderful Hudson from behind Tarrytown. But you went up by train, not very satisfying for one who wishes to see the city die away and the open country unfold before him. After leaving the train, you stepped into a rickety old country carriage, which reminded you strongly of the "One Hoss Shay," and were bumped and tossed out of Tarrytown into Bedford avenue, the two horses laboriously, and with frequent stops, climbing the hills. After a couple of hours of this sort of distracting riding, you found that you had to catch a train which you didn't feel at all sorry started three hours before sunset. You felt that the Pocantico Hills might be most beautiful, that nature might have lavished her best art upon those mounds of earth, but you—well, it may be, you felt that because you are a city business man, facing hard facts and figures six days a week, you had lost the zest you once had for the loveliness of the country.

At any rate, you didn't try the experiment again—at least, not until you bought your motor car, which balks once in a while, and which has its share of tire troubles, but which always manages to "get there." In it, you've been up to the Pocantico Hills several times? Of course you have. And do you forget the first trip there in your car, and its pleasant denouements and surprises, and its exasperating but laughable tribulations? Of the last, you had your full share—two punctures and a little ignition trouble—but you said (and felt it too) that you had enjoyed the day when it was done, and so did your friends who were with you.

You recall that you had scarcely got started through Central Park on your way north when your first puncture occurred. How your heart went into your boots! But that was soon done, your spirits partly being restored by the humorous mounted policeman who leaped from his horse and stood by watching you repair the trouble. He was a typical son of Erin, funny to a fault.

"You fellers," said he in his rich Irish brogue, "remoind me of a horse doethor—a vit'riniry surg'on. Ye show him a horse thot's lame, espicially if he's a 'departmcnt' vit'riniry, 'n' he sez, sez he, 'He's lame here in th' iibow j'int,' 'n' he blishthers him where he thinks th' trouble is. Thin, whin ye tak' him back wan week lather, shtill an th' blink, th' doethor, he sez, 'Oi guiss ut ain't here, ut's here,' 'n' he pints ter th' wrisht j'int, 'n' afther that, ye cum' ter th' conclooshon thot may be ut is, 'n' may be ut ain't, 'n' may be he knows, 'n' may be he don't. Whiniver Oi see a feller monkeyin' wit' his m'chine, ut remoinds me uv th' horse doethor. Now, there's a feller down the road a bit, that was broke down, but he's goin' now loike th' divvil, unless th' m'chine's shtopt or a cop shtopt ut. Th' feller tuk th' tin thing off th' injine 'n' monkeyed with a monkey wrinch here, 'n' there, 'n' iv'rywhere in th' m'chine, 'n' thin he sez, 'Ut's in th'—th'——.' And the officer halted, hesitatingly, and then asked, "Say, does thim m'chines iver have carbuncles?" amid your explosions of laughter. "But anny way," he went on corrected, "somethin' loike ut. 'N' th' feller kep' pumpin' away at th' bundle in front, thryin' to shtart th' thing. Thin finally he wint ter th' dashboard 'n' pushed a button, 'n' wint around to th' front agin' 'n' jumped th' handle, 'n' th' thing shtarted foine—loike a Gattlin' gun. S'long, don't get pinched." And off you went, your sides shaking with laughter. You recall that?

Well, up through the city you chugged right merrily to Lafayette boulevard, from which you could look over a wide sweep of the splendid Hudson for miles and miles. You passed

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a hundred feet or more above Jeffreys Hook, as you bowled along the river road of Washington Heights, historic ground all of it. Soon you reached Inwood and turned into Kingsbridge Road to Spuyten Duyvil Creek.

"By the way," you remarked at this point, "how did this stream ever come to get its curious name?"

"Why, don't you know?" said Jones, who, if you will recollect, was with you. Jones was writing a book at that period on "Historical Sights and Scenes Along the Hudson," and, of course, he was well informed. "It's name originated in the early days when New York was New Amsterdam. Anthony Van Corlear, the trumpeter of Governor Stuyvesant, was sent post haste to warn the farmers up the river of the appearance of the Duke of York, to whom the English king had granted a vast tract of territory in the New World, including New Amsterdam. With the usurper



THE POCANTICO HILLS COUNTRY IS HISTORIC GROUND, ALL AT THEIR

was a fleet of ships of war, and Anthony was also to summon the Dutch patriots to the defense of the city. In those days there was no bridge over the creek, which was not even dignified with a name, and a severe storm arose just before Anthony had reached the stream. He found what seemed to him at first, and to several Dutch farmers who watched his progress, a barrier impassable without a boat—and a boat was not to be had. But not to be daunted in his patriotic errand, he swore valiantly that he would swim the current 'in spite of the devil' (*en spyt den duyvel*) and plunged into the stream. He had swum half way across when he was seen to struggle in the water as if the devil had accepted his challenge and had met him halfway. At any rate, Anthony was seen to place his trumpet to his lips, and heard to blow one mighty blast, and he disappeared forever. From this point the story takes on various conclusions, none of which bear the slightest verisimilitude to truth."

"Just below Yonkers, on the New York side of the Westchester line, was the land owned by the Van Cortlandt family, now Van Cortlandt Park. The latter family eventually intermarried with the Van der Doncks, and the upper half was sold to Frederick Phillipse, who owned extensive lands on the north, and whose favorite residence had been at Castle Phillipse, still standing by the old mill in Sleepy Hollow. The Phillipse family obtained from the King of England a patent creating the property into the Manor of Phillipsburgh. This dignity that fell to the Phillipses was finally perfected in 1693.

"In 1756 a member of the Phillipse family, Mary, was the object of the affections of no less a person than the 'Father of his Country.' Washington, returning from the disastrous defeat of Braddock, was stopping with Beverly Robinson in New York, whose wife was the eldest daughter of the house of Phillipse. Here it was that



OF IT AND MOREOVER BEAUTIFUL AS THE BERKSHIRE HILLS BEST

Washington met and became enamored of Mary Phillipse. He failed to make any declaration of his state of mind (or rather heart) and finally went back to his Virginia home, where he received word shortly after that he had a rival in the field and was advised to make haste for New York to contest the claim. For some inexplicable reason, Washington failed to come, and Mary became the wife of Colonel Roger Morris.

"Out of Yonkers the road runs through Spring Grove to Hastings, and finally into the beautiful little town of Dobbs Ferry, named after the old family of Dobbs, who first settled on this spot in 1698, or thereabouts. During the days of the Revolution the village of Dobbs Ferry was the rendezvous alternately of both armies. Here it was that the British troops mustered after the battle of White Plains, and just prior to the assault of Fort Washington. In 1781 George Clinton and Sir Guy Carlton, the British com-

NO MATTER WHERE YOU GO, A MOTOR IN THESE HILLS



AND ALONG ALL APPROACHES TO THEM GOOD ROADS PREVAIL

mander, conferred on the evacuation of New York City by the British forces."

And thus Jones went on with the entertaining narrative of the places you passed through, until you came to Dobbs Ferry, at which place you found several hills that tried out the merit of your machine, but the road surface was good and you went spinning up the steepest grade on the high. The river road, no farther known as Broadway, but as the Albany Post Road, ran through Abbotsford and Irvington to Tarrytown.

"Irvington," explained Jones at this juncture, "is named in honor of Washington Irving. Just outside of the town is Irving's home at 'Sunnyside.' It can't be seen from the road; it stands too close to the river bank. Tarrytown is another place whose real old Dutch name, *Terwen Dorp* (wheat town),

(*Continued on page 74*)

And Jones went on, a little pedantically perhaps: "This road continues through Kingsbridge, where Washington had his headquarters after the defeat of the Continental army on Long Island, in the dark days of '76, and runs northward, past Mount Saint Vincent to Yonkers, which is, though a city of itself, an intrinsic part of the metropolis. Yonkers is the site where Henry Hudson, and also Dutch traders subsequent to him, found a Mohican Indian village, named Nappechemak, at the mouth of the little rapid mountain stream of the same name, subsequently changing in the progress of time to Nepperhan. The Dutch first settled the town of Yonkers in 1639, after a purchase from the Indian sachems, in which the Indians got decidedly the worst of the bargain. The land passed into the hands of Adriaen Van der Donck, who named it Colombonck. The name Yonkers is a corruption of Jonk Heer's (young lord's).

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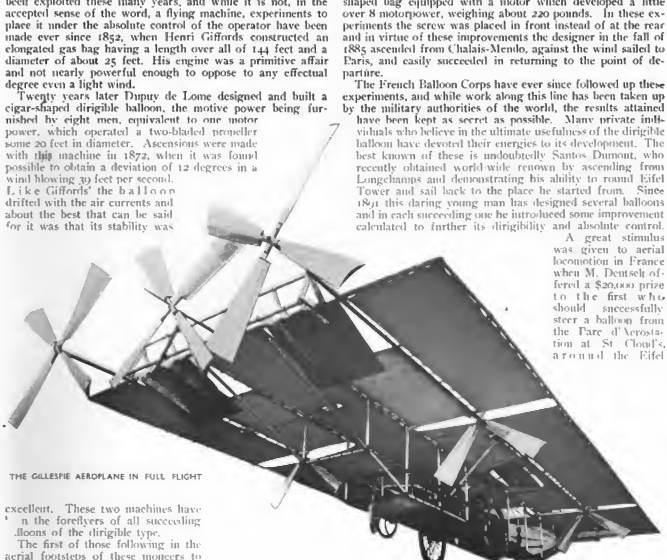
The Present Status of Mechanical Flight

By A. Frederick Collins

THERE are three distinct methods by which man has attempted to navigate the air; and as these differ widely in the principles they involve, and the appliances they utilize for fulfilling the imposed conditions, it is an interesting procedure to compare the results achieved, and to determine, insofar as the law of probabilities will permit, the design, construction, and operation of flying machines in the future.

The balloon as a means of intelligent artificial flight has been exploited these many years, and while it is not, in the accepted sense of the word, a flying machine, experiments to place it under the absolute control of the operator have been made ever since 1852, when Henri Giffords constructed an elongated gas bag having a length over all of 144 feet and a diameter of about 25 feet. His engine was a primitive affair and not nearly powerful enough to oppose to any effectual degree even a light wind.

Twenty years later Dupuy de Lome designed and built a cigar-shaped dirigible balloon, the motive power being furnished by eight men, equivalent to one motor power, which operated a two-bladed propeller some 20 feet in diameter. Ascensions were made with this machine in 1872, when it was found possible to obtain a deviation of 12 degrees in a wind blowing 30 feet per second. Like Giffords' the balloon drifted with the air currents and about the best that can be said for it was that its stability was excellent. These two machines have been the forerunners of all succeeding balloons of the dirigible type.



THE GILLESPIE AEROPLANE IN FULL FLIGHT

The first of those following in the aerial footsteps of these pioneers to make pronounced headway were the Tissandier Brothers, Albert and Gaston, who fitted their balloon with an electric motor weighing 121 pounds, the current being derived from a battery of primary cells which weighed nearly five hundred pounds more. This battery was designed to supply current for 2½ hours and to develop continuously during this time a minimum of 1½ motorpower. Many trial trips were made with this arrangement and in one undertaking in 1884 the motor developed a maximum of 1½ motorpower, driving the two propellers of nine feet with sufficient force to send the structure through the air at a rate of 13 feet per second. In the test under consideration the balloon was allowed to drift with the wind for some distance, and then it was steered around so that its head faced the wind, which had a velocity of 10 feet per second, when it sailed over the village of Grenelle and the same maneuvers were performed above the observatory; after having been in th air for nearly two hours the battery was run down and the balloon could not return to Paris.

At this stage of the game of flight, Commandant Renaud, of the French Balloon Corps, came on the scene with a spindle-shaped bag equipped with a motor which developed a little over 8 motorpower, weighing about 220 pounds. In these experiments the screw was placed in front instead of at the rear and in virtue of these improvements the designer in the fall of 1885 ascended from Chalais-Meudo, against the wind sailed to Paris, and easily succeeded in returning to the point of departure.

The French Balloon Corps have ever since followed up these experiments, and while work along this line has been taken up by the military authorities of the world, the results attained have been kept as secret as possible. Many private individuals who believe in the ultimate usefulness of the dirigible balloon have devoted their energies to its development. The best known of these is undoubtedly Santos Dumont, who recently obtained world-wide renown by ascending from Longchamps and demonstrating his ability to round Eifel Tower and sail back to the place he started from. Since 1891 this daring young man has designed several balloons and in each succeeding one he introduced some improvement calculated to further its dirigibility and absolute control.

A great stimulus was given to aerial locomotion in France when M. Deutsch offered a $20,000 prize to the first who should successfully steer a balloon from the Pare d'Aerostation at St Cloud's, around the Eifel Tower and then return to the point of starting, the entire trip to consume not more than thirty minutes. In the attempts which followed, Santos Dumont sailed the stipulated course, but it took him ten seconds longer than the trial designated. As the distance was approximately 9 miles, the balloon traveled at the rate of about 16 miles per hour. This balloon had a length of 108 feet and a diameter of 19 feet, 6 inches, and was almost the exact pattern of Tissandier's balloon of 1884. His motor was, however, a very decided improvement, being driven by kerosene instead of electricity and developing 20 motorpower with a weight of 216 pounds. Two years ago Stanley

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Spencer directed at will his dirigible balloon over the housetops of London and a little later the Lebaudy Brothers won some fugitive fame by performing some gyrations over and around Paris.

Notwithstanding these seemingly successful issues, there are many untoward circumstances that bar effectually the balloon from ever coming into general use. Among these it may be mentioned that a gas-bag large enough to lift a man and his engine attendant paraphernalia comprises an enormously large surface area, and the wind, though it is only a moderate breeze, buffets it about as though it were a cork on the ocean. Thus from the first efforts of Giffords to the recent trials of Dumont the dirigibility of the balloon has been exhaustively tested as a means of intelligent aerial locomotion and it is now pretty generally conceded that devices lighter than the air will never solve the problem of rational artificial flight.

The next method looking toward the solution of the flight problem is that suggested by the kite or aeroplane. If a plane surface placed at a small angle of inclination is presented at right angles to the direction the wind is blowing the kite will remain poised in the air. Again, if the plane surface or kite could be made to sustain the indicated angle and could then be driven through the air at a velocity equal to that at which the wind was blowing it would sail easily through the aerial ocean. An aeroplane is merely a free kite and, according to Alexander Graham Bell, "a kite so shaped as to be suitable for a flying machine and so efficient that it will fly well in a good breeze (say, 20 miles per hour) when loaded with a weight equivalent to a man and an engine—then this same kite, driven by its own propellers at the rate of 20 miles per hour, should sail through calm air as a flying machine."

The same year that Giffords built his dirigible balloon, namely, 1852, Stringfellow showed his first model of an aeroplane flying machine at London in the Crystal Palace. This little structure was arranged to slide down a pair of wires at an angle and when it had attained its maximum momentum it would leave the wires and glide off into the air. This was the aeroplane principle introduced and a new school of flight was launched which was destined to have in later years the most brilliant *savant* followers. It was not, however, until 1879, when Victor Tatin tested with a greater degree of success at Chalais-Meudon his aeroplane, which was propelled by two screws and driven by a compressed air engine, that this principle could be said to have had any suitable trial.

Again, it is only during the past decade that improvements along this specific line have been seriously considered and these developments in the art have been largely due to Lawrence Hargrove, of New South Wales, and he has, next to Samuel Langley, made the most successful flying models that have ever been built. Hiram Maxim, the inventor of the machine gun, made his first essays in flight in 1892. These were the outcome of many experiments based upon mathematical calculations which had for their purpose the determination of the most effective form of surface to be presented to the air, the best designs of propeller giving the greatest power, and the lightest and most effectual type of engine.

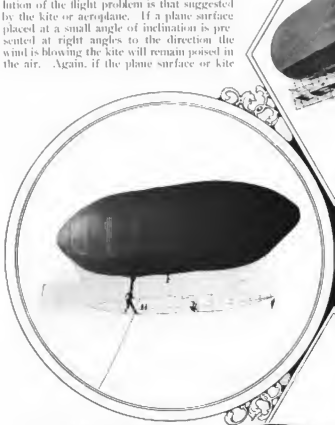
Maxim was the first who utilized the arcuated wing or surface in the aeroplane, and a series of these were mounted above a car by means of a light frame work. From either end of the main aeroplane other sustaining surfaces were attached, and these were spread out like the tail of a bird and were made movable at the will of the operator. The complete machine weighed 8,000 pounds and 5,000 square feet of arcuated surfaces were employed to sustain the machine in the air. Like Stringfellow's model this machine was run on a track until the force of the impinging air became great enough to carry it upward. In the trials which followed only 40 of the available 300 motorpower was used, and had the machine been properly designed 45 motorpower would have been ample to have propelled it.

As it was the aeroplane was not properly balanced and just as the machine got fairly into the air it toppled over and was wrecked. But it proved one thing, to wit, that it is an easy matter to build an engine light enough and at the same time providing the requisite power for driving a flying machine. The investigator who has attained the greatest success with aeroplanes is Samuel Langley, of the Smithsonian Institute; and he believes that success can best be had by following the course mapped out by Maxim and, in fact, the mantle of aerial navigation that the latter laid aside became the legitimate property of the former. How well Langley deserved it will be seen when it is stated that he constructed the first machine on this principle that ever flew.

That there is a great difference between the two machines will be observed when it is stated that Langley's weighed only

AIRSHIP BUILT FOR THE BRITISH WAR OFFICE OF 180 M.P

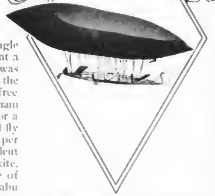






THE ARROW OF CAPT. THOS. BALDWIN, OF CALIFORNIA

THE ARCHDEACON AEROPLANE



THE DIRIGIBLE *ITALIA*, THE ITALIAN COUNTERPART OF THE LEBAUDY AIRSHIP

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30 pounds as against Maxim's 8,000 pounds. The arcuated surfaces or curved wings which sustained the aerodrome were arranged in pairs, two on either side of the body, which measured 18 feet in length; these wings projected 7 feet from the point where they were attached to the body to their tips and were inclined upward at a small angle. The cause of disaster to Maxim's machine was the center of gravity was too low, and to avoid this in the aerodrome it was placed much higher.

The motive power was supplied by one of the most efficient and lightest steam engines and boilers ever built, developing 1½ motorpower with a total weight of about 7 pounds. The propellers were three feet in diameter and placed in the middle, and on either side of the body and between the wings. By resorting to this method the air taken was received equally from above and below the wings. This little model made several flights over distances of a mile, and had not the steam supply given out it would have covered much longer distances; but it had served its purpose in that it demonstrated conclusively that bodies heavier than the air could be easily sustained by it if they were properly designed and had the requisite power. The great objection to the aerodrome and to all flying machines of its type is the difficulty experienced in getting them into the air. In Langley's case it required the utmost ingenuity, for it had to be launched at a speed equal to that at which it was intended to fly.

Besides the balloon and aeroplane, both of which have been tested sufficiently to indicate that the solution of man flight is not to be found in either of them, there is another, a more reasonable way, which has never yet had a fair and impartial trial. This method is the beating wing and it is the belief among many of the younger students of mechanical flight that this is the only way to circumvent the difficulties that stand out so forcefully in the others. As an unanswerable argument to all who oppose the beating wing they point to the bird as a living example of how flight should be performed and how very true it is that these living exponents of aerial navigation perform such vital functions as arising from rest, flying faster, carrying a load, maintaining balance—in fact, everything except soaring is accomplished by the more or less rapid motion of its wings.

Hargrave has provided some beautiful flying models that had as their means of propulsion the beating wing. There is no doubt that if larger engines had been provided the distance covered could have been greatly increased. Another very encouraging feature, though it cost Otto Lilienthal his life, in favor of the beating wing, was the mechanism he invented which was based upon this theory of flight. His machine consisted of three pairs of wings arranged on either side of a central supporting structure and these he kept in motion by a pedal arrangement. The wings were formed of light strips of material and one pair on each side were always on the down stroke. Those that were on the up-stroke were opened automatically, so as to offer no resistance to the air. With this crude and cumbersome contrivance, which he worked himself—and man power is notoriously the most inefficient motive power known for flight—the machine raised one-half of the combined weight of itself and its operator. If a similar mechanism were constructed along good lines and an engine of ten pounds per motorpower were installed to operate it, instead of the power of a man who develops approximately one-eighth of a motorpower, nothing can show, not even higher mathematics, that the machine would not ascend.

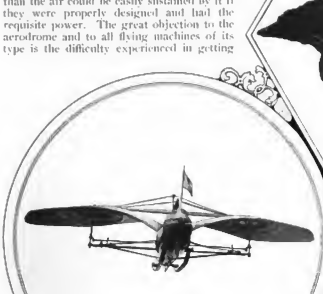
The situation of aerial locomotion may then be summed up as follows: The balloon is the most successful mode of artificial aerial navigation we have to-day, for it will do that which neither the aeroplane nor beating wing mechanism can do in their present stages of development, i. e., to ascend into air carrying an operator and remain there for an indefinite length of time. Notwithstanding this seeming great advance, the balloon, in my opinion, must always remain without the pale of commercial utility for reasons previously cited, i. e., the enormous surface area required to lift a load, the resistance it offers to the wind, and finally its frailty.

The aeroplane has demonstrated its possibility of navigating the air, but the thorough experiments of Maxim and Langley point clearly enough to the fact that the limits of success have been reached with this type of flying machine, since landing becomes as great a problem as that of flight itself, while the maintenance of equilibrium requires a deal of skill, and the proposition of alighting is not much easier. The principle of the beating wing would meet every one of the objectionable features found in the other two. The machine would not need any subsidiary equipment to assist it to start, stability

(Continued on page 88)

AIX AEROPLANE—OF WHICH THE BIRD IS THE PROTOTYPE





LE PRÉCURSEUR—THE AIRSHIP OF A P PHILIPPI HEAVIER THAN THE AIR



AIRSHIP OF ROY KNABENSHUE WHICH IS SIMILAR TO THE ARROW OF CAPT. THOS. BALDWIN, OF CALIFORNIA



THE MONTGOMERY AEROPLANE, SHOWING MALONEY, THE AERONAUT WHO WAS KILLED IN CALIFORNIA RECENTLY

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THE EFFECT of the MOTOR CAR ON HEALTH



BY HALLAM HALL

THE effect of the motor car on health is a subject which broadens out mightily the more one looks at it. At first blush it seemed entirely bounded by, and rounded out in, consideration of the harm it could do. Was such a machine consistent with the physical structure of man? Would not the vibration be injurious to the spine? Would not such swift motion through the air injuriously affect the eyes? Would not the rapidly-passing nearby objects, by the roadside, end in vertigo, and its consequences? Would the heart be able to stand the strain? Of course, prejudices like these vanished like dream phantasies in the awakening light of experience, or were obviated by the simplest precautions.

Then, presently, it began to dawn upon the public that a new health factor had entered into our lives, both individually and collectively. The practicing doctors were the first to recognize its beneficence. They knew that the most essential point in regard to health, in cases where their aid was required, whether it was the visit of the stork, or apoplexy, paralysis, fever, or a broken leg, was that surgical and medical skill should be available at the first possible moment, and the earliest purchasers of light runabouts always at hand day and night for every emergency, capable of a speed never before attained, were the members of the medical profession. The tinkle of the telephone call scarce subsided, ere he, and his kit, was off and away, and plying his skill within a period of time which, under the old system, would have been needed to call up his driver and harness his horse. At that time he must have a driver; he could not leave an untended horse in the street for an indefinite period as he can an untended motor car. Many a precious life has been saved, and many a serious complication avoided by the promptness of the first aid made available by the motor car's readiness and speed. Nor is the possession of a car less important in the later developments of a disease. Many a visit, the last thing at night, is now made, which in the old days there would have been a justifiable disinclination to make, because of tired horses, or distance. It was running a risk, may be, but the doctor gave the horse the benefit of the doubt, and retired, often with an uneasy conscience, to find in the morning that there had been a retrogression in his patient's condition, which that "last thing at night" visit might have obviated or mitigated.

Speaking of distance brings another plan of the motor car's aid to health to the fore, inasmuch as it has vastly widened the area over which the best skill is made possible of consultation. Many a district, hitherto accessible only to such local talent as was almost within shouting distance, and cut off by miles of open country from the practitioner whose presence was most desirable, are now within his reach, to the great benefit of the patients, and, incidentally, to the great pecuniary advantage of the profession. The motor car pays the physician and surgeon a direct return upon his outlay.

The hospitals were the next to recognize the immense advantage of the motor vehicle when applied to the ambulance. It goes without saying that the very essence of the value of an ambulance, kept at a fixed point, such as at a hospital, is, that it can reach the site where a catastrophe, or accident, has happened, at the earliest possible moment, and return to where the doctors are assembled with the greatest alacrity, lest the life of the stricken ones may ebb on the way. Thousands upon thousands of cases, which would otherwise have been very serious, perhaps fatal, have been prevented, by the difference in time, though it only be a few minutes in each direction, between the horse-drawn vehicle and swift and easily-handled motor car. It does not need the expert knowledge of a surgeon to recognize the immense value in the decrease of suffering when bones are broken and splintered, between the jolting motion of the most carefully driven horse ambulance and the almost perfect equilibrium of the motor car in this respect; its value does not end with its first aid to the wounded, it frequently happens that often the patient has left the operating table, it may be at once, or in a day or two,

(Continued on page 70)

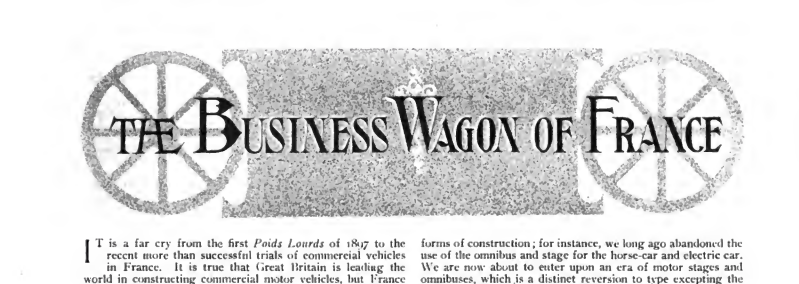


MOTOR CAR AMBULANCES ARE NO LONGER EXPERIMENTAL. THEY ARE ESTABLISHED BEYOND QUESTION AS BETTER THAN THE HORSE-DRAWN VEHICLE



FOR THE DOCTOR THE LIGHT RUNABOUT IS IDEAL

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IT is a far cry from the first *Poids Lourds* of 1897 to the recent more than successful trials of commercial vehicles in France. It is true that Great Britain is leading the world in constructing commercial motor vehicles, but France is not far behind, and the trials prove that it is the evident conviction of the French builders that the commercial motor wagon industry will eventually exceed in volume their own magnificent constructions which have been so long used on the road for pleasure and touring purposes. Is there not a lesson and a warning in this for American builders? To those who read the signs aright the horizon of the future indicates not only the use of the commercial motor vehicle for business purposes but for the omnibus also, a reversion, it is true, to type, for urban and suburban traffic conditions.

Reversion to type, a well-known phrase of the scientific evolutionist, means here the return to earlier and once discarded forms of construction; for instance, we long ago abandoned the use of the omnibus and stage for the horse-car and electric car. We are now about to enter upon an era of motor stages and omnibuses, which is a distinct reversion to type excepting the use of mechanical motors instead of hay motors.

With this view the optimist will surely agree, but the pessimist will rail at it and adhere to what abroad is called the tram car and here is called the trolley car with its fixed rail and route, but the self-contained unit, the dirigible motor-bus, when once its advantages for variable routes are discovered and realized, will prevail.

The first trials of French commercial vehicles were held in 1897, and the three routes laid out near Versailles totalled ninety-five miles, of which about seventeen miles were on stone pavement. Fifteen vehicles entered, but ten only appeared; the Scotte. Weidknecht, Labland, De Dietrich, Panhard, De Dion,

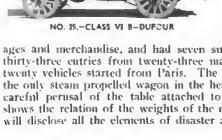
Table of Vehicles taking part in the French Trials (excluding Military Section)

Vehicle		Gross weight	Useful load	Motor				Front Wheels		Back Wheels		Drive	Change Gears	Frame
No.	Make			M. P. Makers	Cyls	Bore	Stroke	Diam	Tires	Diam	Tires	Width			
Class I A		kilos	kilos			m.m.	m.m.	In.		In.		In.			
41	Dietrich	2,278	667	16	4	104	120	35	Pneumatic	35½	Pneumatic	5	Chain	4 and R	Prsd. steel
42	Dietrich	2,278	787												
43	G. Forest	2,140	800	24	4	105	140	35	Pneumatic	4	35	Pneumatic	5	Cardan	4 and R	Prsd steel
52	Peugeot	3,175	1,050	40 12	2	105	105	32	Ducasble	4	32	Ducasble	Twin 3½	Chain	4 and R	Steel chan
Class II A															
43	Dietrich	3,840	1,300	16	4	104	120	32½	Pneumatic	4	32½	Pneumatic	5	Chain	4 and R	Arm. wood
44	Dietrich	4,147	1,083	24	4	130	120								
45	Serpollet	4,600	1,600	20	4	84	90	—	—	—	—	—	Chain	None	Steel chan
50	DeDion	3,600	1,200	24	4	104	130	32	Solid	4	32	Solid	6	Cardan	3 and R	Arm wood
55	Aries	1,130	1,667	12	2	105	140	32	Solid	3½	32	Steel	4	Chain	3 and R	Prsd. steel
Class V A															
46	Krieger	7,972	3,600	24	4	104	120	34	Falconnet	4	32	Falconnet	1 by 3½ / 1 by 4	Toothed gear	2 (contr'l)	Prsd steel
48	Serpollet	6,379	2,400	30	4	90	125	36	Falconnet	4	32	Falconnet	Twin 3½	Chain	None	Steel chan
51	DeDion	5 938	2,160	24	4	104	130	32	Solid	4	32	Solid	Twin 3½	Cardan	3 and R	Arm. wood
53	Mors	6,614	2,160	24	4	108	150	34	Sirdar	3½	32	Sirdar	Twin 4	Chain	4 and R	Prsd. steel
54	Brille	6,212	2,160	18-24	4	120	120	35	Ducasble	5	32	Peters	Twin 4	Cardan	3 and R	Steel chan
Class I B															
20	Contal	318	70	4½	1	86	86								
21	Contal	323	70	4½	1	72	80	26	Pneumatic	2½	26	Pneum'c Samson Tread	2½	Chain	2	Tubes
22	Contal	310	65	2¼	1	72	80								
Class II B															
5	DeDion	1,070	180	8	1	106	120	30	Pneumatic	3½	30	Pneumatic	3½	Cardan	3 and R	Tubes
31	Automoto	1,634	261	16 20	4	100	150	36	Pneumatic	3½	36	Pneumatic	5	Chain	4 and R	Prsd. steel
Class III B															
4	G. Forest	1,756	600	12	1	145	170	32	Pneumatic	3½	32	Pneumatic	3½	Cardan	3 and R	Tubes
6	DeDion	2,320	870	16	2	90	140	33	Pneumatic	5	36½	Pneumatic	5	Cardan	3 and R	Arm wood
23	Aries	1,720	800	12	2	105	140	32	Pneumatic	3½	32	Pneumatic	3½	Cardan	3 and R	Prsd. steel
30	Clement	2,010	560	16	2	105	140	35	Pneumatic	4	35	Pneumatic	5	Chain	4 and R	Arm. wood
Class IV B															
24	Delahaye	3,020	1,415	12 14	2	110	140	33	Falconnet	3½	42	Falconnet	3 by 3½	Belt, 1st gear / shaft, & chain	3 and R	Tubes
Class V B													3 by 3 Rb pads			
2	Dietrich	3,350	1,498	12	4	95	120	30	Solid	3	32	Le Francais		Chain	4 and R	Arm. wood
19	Latil	4,761	1,641	12-14	2	105	140	30	Solid	3	32	Iron	3½	Front wheels	3 and R	Ord. wag'n
29	Gladiator	3,183	1,000	16	2	105	140	32	Pneumatic	5	32	Solid	4	Chain	4 and R	Arm. wood
Class VI B															
3	Krieger	6,260	3,100	16	4	85	110	—	—	—	—	—	—	—	—	—
8	DeDion	6,118	3,100	24	4	104	130	32	Solid	7	32	Le Francais	3 by 3 Rb pads	Cardan	3 and R	Arm. wood
11	Latil	4,598	1,600	12-14	2	105	140	32	Solid	6	32	Iron	5	Front wheels	3 and R	Ord. wag'n
12	Turgan «	5,600	3,100	24	4	105	140	34	Solid	5	42	Solid	2 by 4	Chain	4 and R	Steel chan
14	Delaugere	5,800	3,200	15	4	90	130	34	Steel	4	36	Steel	6	Chain	3 and R	Arm. wood
15	Cohendet	7,370	4,068	18	2	140	140	32	Steel	3½	34	Steel	4	Chain	4 and R	Arm. wood
16	Cohendet	7,410	4,067													
17	D. A. C	7,626	4,220	16-18	2	165	220	32	Steel	4½	42	Steel	5½	Belt, 1st gear shaft, & chain	3 and 3 R	Arm. wood
19	Brillie	8,710	5,350	18-24	4	100	120	33	Steel	4	36	Steel	7	Cardan	3 and R	Steel chan
24	Aries	4,760	3,000	12	2	105	140	31	Steel	4	31	Steel	4	Chain	3 and R	Prsd. steel
25	Dufour	7,112	3,100	16	2	130	160	36	Steel	4⅜	39	Steel	4½	Cardan	3 and 3 R	Arm. wood
26	Daimler	6,454	3,146	24	4	108	140	28	Solid	3½	36	Solid	2 by 4½	Belt, 1st gear / shaft, & chain	4 and R	Steel chan
28	Cotterean	7,600	4,350	20	4	95	120	36	Solid	3½	36	Steel	7	Chain	4 and R	Steel chan
Class VI (a) B															
9	N. A. G.	6,533 / 3,132 / 1,303	3,000 / 2,000 / 2,000	24	4	120	140	38	Steel	5½	48	Steel	8	Chain	4 and R	Prsd. steel
13	Turgan	8,000 / 3,570	4,000 / 2,300	20 90	4	140 / 200	130	32	Steel	8	42	Steel	12	Chain	None	Steel chan

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and Maison Parisienne. Each vehicle was to go over the route twice, making about one hundred and ninety miles. Since then the *Poids Lourds* of the Automobile Club of France in 1898, 1899 and 1900 were based on similar conditions in connection with the Vincennes section of the great exhibition of that year. During the years 1901 and 1902 it required herculean efforts in France to keep up a spasmodic interest in the commercial wagon proposition. The makers who catalogued both pleasure and business motor wagons had all they could do to meet the demand for pleasure vehicles, and so, of course, abandoned the commercial vehicle. Late in 1904 the *Chambre Syndicale*, which corresponds to our local Chamber of Commerce, and is therefore the all-powerful combination of French makers, became imbued with the idea, and not without reason, that France was indeed behind other countries in the commercial motor wagon movement. As a result the Count De Dion obtained from the Automobile Club of France the authority for the *Commission des Concours* to hold the recent trials. The trials were supposed to be international, but were really only continental, as Switzerland and Germany were the only makers represented besides the French makers.

We know why the American makers did not exhibit, and that is because we are not as yet very well advanced in the art of making motor wagons, but we are surprised, considering the publicity such a trial affords, that the English makers did not enter. The conditions of the trials provided for two sections, each of which was again sub-divided according to the load carried; the points which weighed most with the judges were the performance and ease of management as determined by the observer's records. The loads carried and the capacity for hill climbing were also viewed as of importance. The class for the big motor-buses was arranged in conjunction with la Compagnie Generals des Omnibus de Paris. All the chasses, excepting the Mors, were mounted with bodies taken from the company's daily use in Paris. These, it is surprising to note, were rather heavy, weighing no less than 1,900 kilos, but under the rules eighteen inches in width was the minimum of the seating room for each passenger. In this class the principal points were: First, behavior and control on the road; second, regularity of running; third, fuel consumption per gross ton hauled, and the number of tons hauled of useful load; and, fourth, the distance run without replenishing fuel, water or lubricants.



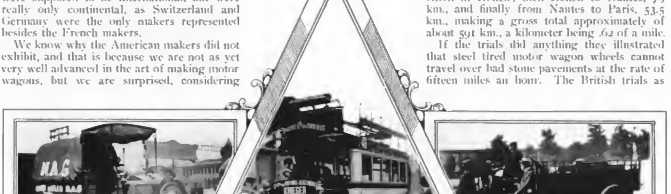
NO. 15.—CLASS VI B—DUFOUR

The second section was for packages and merchandise, and had seven sub-divisions. It had thirty-three entries from twenty-three makers, out of which twenty vehicles started from Paris. The Turgan No. 13 was the only steam propelled wagon in the heavy goods class. A careful perusal of the table attached to this article, which shows the relation of the weights of the machines and stores, will disclose all the elements of disaster and reveal that it is an axiom in motor wagon practice that success does not follow overloading.

Another section of the trials was that held under the auspices of the French Minister of War for military baggage and ammunition wagons limited wholly to vehicles of French construction. These are, however, not so pertinent to the question at present as the regular commercial motor wagon, hence we will pass them by for the time being, reserving the subject, which is worthy of it, for a future article.

The vehicles, sixty in number, gathered in the Tuileries Gardens, Paris, and the ten days' trials covered the following itinerary: First day, Paris Compiegne, 95.5 km.; second day, Compiegne-Amiens, 73.7 km.; third day, after laying over a day in Amiens for an exhibition from Amiens to Dieppe, 98.9 km.; then followed a rest of two days at the exposition in Dieppe; then from Dieppe to La Havre, 105.6 km., laying over one day at the exposition at La Havre; then from La Havre to Rouen, 88 km., spending a day at the exposition in Rouen; then Rouen to Nantes, 79 km., and finally from Nantes to Paris, 53.5 km., making a gross total approximately of about 591 km., a kilometer being .62 of a mile.

If the trials did anything they illustrated that steel tired motor wagon wheels cannot travel over bad stone pavements at the rate of fifteen miles an hour. The British trials as long ago as those of 1897, at Liverpool, proved conclusively that drivers and makers must give up the fallacious idea of high speed, because it is not synonymous with success in commercial motor wagons. It is only history repeating itself, however, for every driver of a horse drawn wagon knows the need of going slowly over bad pieces of road and railroad crossings, and of making pace where the road is good. While on the subject of wheels it is to be noted that many of the French makers use wheels of the artillery type with the spokes pocketed at the rim end and fitted with adjusting and locking nuts to take up any slackness, the use of this system being almost universal even when rubber tires are used. Many of the driving wheels were too small in diameter, some of the rear wheels being only 31 inches in diameter. Of course, others have unusually large driving wheels fitted with steel tires one and one-half inches thick.

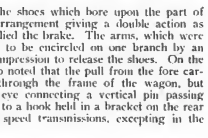


NO. 9.—CLASS VI (a) B. N. A. G.

NO. 46 CLASS V A. KRIEGER

NO. 14 CLASS VI B—DELAUGERE

As was expected, brake construction was of ample strength and service, a novelty being the arrangement of the brake gear on the rear axle of the Latil *avant train* No. 11. In this method the members of the Lemoine bands were coupled to arms from a rod carrying the shoes which bore upon the part of the rear wheels, the arrangement giving a double action as soon as the driver applied the brake. The arms, which were forked, were arranged to be encircled on one branch by an ordinary spring and compression to release the shoes. On the Latil wagon it was also noted that the pull from the fore carriage was not taken through the frame of the wagon, but through a stout wire eye connecting a vertical pin passing through the front axle to a hook held in a bracket on the rear axle. All the change speed transmissions, excepting in the



NO 13.—CLASS VI (a) B—TURGAN

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steam and electric vehicles were of the sliding tooth wheeled type, but most of the wagons used chain drive in preference to shaft drive.

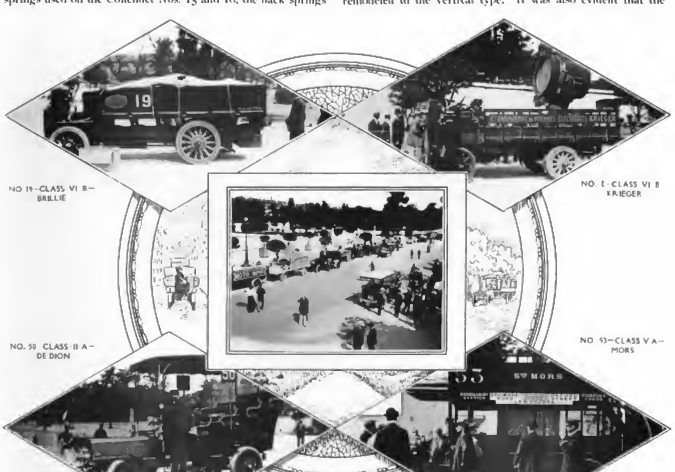
Many of the chains were too light for the work. A novelty in the chain line was that known as the Pilat, which is on the well-known Renault type, excepting that the extreme outside of each alternate link is made solid instead of being toothed. The semi-circular flange so formed served as a guide to keep the chain on the toothed wheels. On two of the cars the belt drive was employed from the engine to the drive of the gear box. The frames embraced all the well-known types, armored wood, tubular, pressed steel and steel channel.

The most favored was the armored wood type or *bois de arme*, as the French call it, of from 7 to 8½ inches in depth but fitted in many cases with light steel cross members. It was, however regrettably noticeable that some of the wooden frames with light flitch plates sagged exceedingly while en route. There was very little trouble with the springs, during the trials, a particularly able spring being the long flat springs used on the Cohendet Nos. 15 and 16, the back springs

reference to the width of two members of a twin-tired driving wheel. The inner tires next to the frame on each side were 1½ inches wider than the outside tires, the theory being that the inner sides of the driving wheels get a better bearing on a cambered road surface.

An extreme novelty was a tire called Le Français, which consists of a series of rubber blocks, each block being about six inches long by three inches broad, and varying in thickness from one and one-half to two inches. The blocks are separately secured on a series of plates which lap over one another and over the bases of the moulded rubber blocks, each plate having two 5-16 inch rivets passed through it, being alternately inside and outside the rim. The greatest wear on each tire was on the rearmost end of each pad. The idea of dividing the total amount of rubber into 22 or 26 separate pieces for each wheel, it is evident, eliminates the risk of creeping, which is possible where tires are in one continuous or endless piece.

Nearly all the engines were vertical, only three wagons being shown with horizontal engines, and even one of these is to be remodeled to the vertical type. It was also evident that the



being fifty-five inches long and the front springs only two inches shorter, the rear spring having thirteen plates.

They evidently leave the tire problem with them abroad as we have it here, for the tire problem, like the poor, is always with us. Nearly every type was employed, and it is significant that the award at La Havre was given to a well-known American tire which has transverse metal bars every inch of its length to take off the enormous pressure of the circumferential wires. Nearly all the various types of tires suffered from heating. It was noted that the greatest development of heat apparently occurred when the tire was very deep on the rim, and the conclusions indicated that for equal weights the less the amount of rubber, or rather the thinner the bars of rubber, the cooler the tire is kept while in use. It is an axiom in the tire trade that a thin tire is always to be preferred to a thick one, provided the thin tire is of a reasonable width.

It must be said in explanation of this that where the tire does not stand out much from the rim there is considerably less leverage and less internal friction on the rubber from the oscillating and lateral movement. A peculiarity was noticed in

makers are about through with the honeycomb type of radiator, which has troubles of its own regarding the repairing of leakages. Many of the radiators were of the coil type and fitted with gills, and some of them were set inside a casing for further cooling by means of an air fan, most of these fans being driven by belts from the crank shaft. The circulating water pumps were largely driven by frictional contact with the face of the fly wheel, and in twenty of the cars where gearing was used the gearing was not enclosed. Eight of the wagons used chain drives and two of them belt drives, while the coming thermosyphon principle was used only on three wagons.

Ignition was largely by means of accumulators, coils and sparking plugs, and in many instances they were wholly without the alternative of the magneto. An ingenious thing in lubricating methods was that of conveying the oil by pipes to the under side of the bearings, the idea being to avoid the admission of the lubricant at the point of maximum pressure, and in two instances the differential shaft bearings were con-

(Continued on page 68)

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SOCIETY FOLK WHO MOTOR

By Priscilla Speedwell

WE still have a great many matrons with old-fashioned scruples against tan and a toughened skin. Mrs. John Jacob Astor always plays tennis so closely veiled one wonders she can see the balls through the chiffon-armor. Of course, there are the very young athletes among "married maidens" who sail boats, swing tennis racquets, and even play baseball (there was a wonderful petticoated nine at Bermuda last summer), and who would never sacrifice a half hour's fun for the sake of being more decorative. Mrs. Larry Waterbury, always lively and lovable, is an example of the strenuous "married maiden" of this sort, especially at Newport, when she wears her very short white skirt and a poke bonnet with the strings dangling at each side. These strings she pulls excitedly while she watches young Larry making a play at polo, and, perched on a fence just as likely, the tilt of her bonnet and the tug at the strings indicate



Photograph by Hyde

MRS WILLIAM G ROELKER

Mrs Roelker who was Miss Coralie Coudert, has long been noted for her ability as driving four-in-hand and is now much interested in motoring.

her approval of the score. But motoring as an outdoor pleasure—to return to the subject of complexions—seems in no way to injure a delicate, roseleaf bloom. A great many well-known motorists have wonderfully pretty wives.

Mr. and Mrs. William G. Roelker always travel together, and Mrs. Roelker (formerly Mrs. W. Gould Brokaw), who is a superb blonde with blue eyes and a peaches-and-cream complexion, usually wears rainproof coats of navy blue satin with a navy blue hat, the frock beneath being often of soft silk of the same shade. In her ears there are always the single pearls, each like an immense snowdrop. When Mrs. Roelker arrives at a clubhouse (Belmont Park, for instance), she contrives very cleverly to step out unswaddled. There is not even a swirling, winding veil and not one lock of her blonde hair is out of place. Many of the Mmes. Mobile are so swaddled that they look much like the wives of Kader, the Berber Arab, who, this summer, in New York, made rapid-fire sketches (with all this matrimonial assistance) on the vaudeville stage. Each one of the three Mmes. Kader wore a white veil and bag-like burnous, but when, with their lord and master, they drove out in a victoria along Broadway, they were not so very extraordinary in New York eyes, since we are accustomed to the veiled and swaddled Mmes. Mobile.

Mrs. Perry Belmont, a brown-eyed beauty, will often be seen in motor attire. She, too, will never hide her graceful figure in any coat that bags. Her cloaks for motoring and coaching are usually écru in shade and trimmed in golden brown, her hat and frock harmonizing or matching. Another beauty among the Mmes. Mobile is the wife of Paul D. Cravath, the white-haired giant so well known as a lawyer, who made a motoring tour of New England this summer. Mrs. Cravath is like a Southern magnolia, the summer sunshine seeming to improve rather than injure her, just as it does in coaxing open the big petals of the creamy flowers. She was Miss Marie Huntington, the actress, and first-nighters will recall her in "Tom Jones."



Photograph by André Ducourt

MME. CALVE

SO long as the motor-meet for the Vanderbilt cup remains an event on the calendar there will be one day in the year when our luxury-loving society will rise at crack of dawn. There will be several representatives of every circle of society, so society intact will really be there. The Meadow Brook set—the Hitchcocks, the Brooks, and Miss Adelaide Randolph—who are also the Aiken sports, do not mind the early rising a bit, for down south they meet for the hunt at daybreak, and the hounds are baying before the sun is up. But their guests, who come down for the race, rub their eyes and grumble. Last year at ten o'clock those who had arrived in the gray dawn thought it must be late in the afternoon. Every man thought his watch had stopped. One chilly-boy expressed it exactly: "Why," he said, "I feel like twelve o'clock to-night. I cawn't remember getting up so early since the days when we used to steal out of the house to shoot sparrows against the law."

* * *

ROBERT B. ROOSEVELT, who is first a statesman and an author, and secondly is an uncle of the President of the United States (second because he was a natural character while his nephew, Theodore, still wore knickerbockers), is enjoying his motor car at his country home near Sayville. His wife's have long been motorists, but their recklessness and speed were too great for Pere Robert, so now he has his own chauffeur and car. Although a scholarly man—he was one-time Minister to the Netherlands—he has always been in sympathy with the benefits of outdoor sports. He has written about "Fish Hatching and Fish Catching" and "Florida and the Game Water Birds," so, as he has an alert mind and a sprightly humor, something very amusing about motoring may be expected from his pen. He presided last winter at the meetings of the "Entertainment Club," of which Mrs. Roswell D. Hitchcock is president, and made all the little speeches, introducing the lions, who were to make the addresses of the evening. But very often Uncle Robert's introduction of the speech maker to his audience was more entertaining than the longer talk-

MRS P A VALENTINE

Mrs Valentine of the Chicago matron who, at the fete given at Onwentsonwe this past summer entered several cars in the motor parade and also gave valuable prizes



Photograph by Aime Dupont

that followed. Though seventy-six years old one thought of his age only through his possession of a finer sort of courtesy, for while on the platform he had an easier manner and quicker tongue than younger men.

* * *

WHO can imagine the fascinating, impatient Carmen in a motor car? Exceeding the speed limit? Yes, that seems compatible with Carmen. But Carmen in a breakdown, Carmen at the roadside! Where's the man who would be the chauffeur? Down on all fours he would needs make repairs, for—of course not a dagger—but with a stout switch from a roadside tree or bush which Carmen might think to help to teach him expedition. Of course, only Calvé is Carmen. She has rivals in the role, but one associates her with the capricious heroine, just as the gentle Jefferson with old Rip. Yes, Calvé has "gone in" for motoring, and has learned to run the car herself, so her chauffeur, at times, serves the purpose only of being a "Handy Andy" for repairs. Unlike the Goulds and DeLancey Nicolls, she will be able to tour in peace through the south of France, and almost all parts of the Continent, for her fame is known to the peasantry. Recently the celebrated French singer, whose allegiance to horses for motor purposes has always been strong, acquired a big touring car, which now shares a place with her runabouts and carriages in the stables of her castle at Areyron. Since owning the car Mme. Calvé has made the trip to Nice and Monte Carlo in it, touring in Southern France and Italy, and she expects to spend much time thus until she sails for America.

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The Woman's Motor Club

THE THIRD RUN

By Grace Margaret Gould

"TALKING of separate coats," cried little Miss Elting, as the fair heads drew closer in their interest, "you ought to see my new motor coat which I have bought just for this third run of ours. It is really something entirely new, and I know I could wear it many times when I'm not motoring."

"Oh hurry up Helen and get down to details. What's it made of?"

"You've never seen anything like it, Clare Raymond," declared Miss Elting. "It is made of shadow plaid cloth—I hardly know how to describe it for it shows different colors *about* every time you look at it. But the background is a sort of creamy tan, a little too perishable to be practical, but then you don't see much of the light color because it is mostly covered up by a plaid which is woven in the cloth in red, gray and pale brown threads. The cuffs are of brown suede and the collar is lined with it. It is a long, full coat and is really awfully good style——"



Courtesy of Brandenstein Fur and Leather Co.

A Long Full Coat of Shadow Plaid Cloth

Bang! came down smartly Miss DePeyster's gavel. "I really must insist on order being preserved at the meetings of the Motor Club," she said in her severest tone. "Mrs. Blair, we are ready to hear from the Committee on Routes."

Mrs. Blair came forward confidently with an air of bringing a welcome suggestion. "You will be glad to know," she began, "that your committee reports unanimously in favor of our next run being from Pittsfield to Hudson, New York, by way of Shaker Village, Queechy Lake, Canaan Four Corners, New York, through East Chatham, Chatham, and Ghent, to Hudson. The distance is 36 miles each way. The detailed report on the route is not yet fully prepared, but our secretary will present it before the meeting adjourns. But I may say that the route is most picturesque, comprising the beautiful hills overlooking Shaker Village, the circuit of Queechy Lake and many a long, level stretch of well-built road, past thriving farms and old homesteads——"

"The very thing," interrupted Miss James, springing to her feet and excitedly waving a bulky manuscript. "Mrs. Blair, you really must let me report from the Committee on Suggestions at this very point, for your mention of old homesteads is too deliciously apt for anything.

"We desire, ladies, to make this next run a souvenir run. There is nothing like some article picked up on a trip to bring back all the pleasant memories of that trip—a little jug, for instance, an odd-shaped candlestick or some rare old delft plate. Why, any one of them would recall to mind the picture of the old-fashioned cottage where it was purchased, and any little incident, funny or otherwise, that occurred at the time. From what I have been able to learn, the old homes in the vicinity of the Shaker Village contain many a prize in the way of antiques, so why shouldn't we make it one of our purposes to gather in as many as possible of them——"

"Antiques," interrupted Miss Allison, merrily, "I should say we might find plenty of antics in Shaker Village from all I've heard of their queer dress and weird dancing."

The mention of dress was irresistible. Again the fair heads in the further corner bobbed together as the meeting slowly recovered from Miss Allison's audacious jest.

"Oh, girls!" whispered Miss Raymond, "did you know that it was fashionable to have a favorite bug nowadays?——"

"A favorite bug!" echoed pretty, little Miss Knickerbocker. "What do you mean, Clare Raymond?"

"I mean just exactly what I said," hurriedly went on Miss Raymond, "but, of course, I don't mean a real, live bug; I mean a bug design to use wherever it can be worked in on one's jewelry. I've taken a katydid for mine. I don't know why, excepting that I liked the color of the one the jeweler showed me. It's in the loveliest shade of green imaginable, I mean my katydid is, not the jeweler, and you ought to see how effective it looks mounted on my new gun-metal motor hatpin. The jeweler said I could have jeweled eyes——"

Again the president's gavel rapped insistently. "Your president," she announced, "will be forced to exercise the power of fining, conferred upon her by By-law 3, unless proper decorum is observed."

"Madam President," said Miss Ladue, "I move that any money derived from such a source be expended for candy to be eaten en route by those who have behaved themselves at the meeting."

This motion being carried, the threat implied in it immediately brought every member again to attention.

"We have been going along rather irregularly," said Miss DePeyster, "I must ask that the next report be submitted without interruption. Mrs. Beaumont, what does the Commissary Committee suggest?"

"The Commissary Committee suggests pot-luck," said Mrs. Beaumont amid a hearty, good-natured laugh all around.

"I was going to keep my new motor coat for a surprise," said Miss Raymond. "I've bought a stone gray cloth coat striped with a darker shade of gray. It is three quarter length and it's awfully nice and warm, and the collar and the cuffs are of green leather. Don't you think that is stunning? The buttons are green leather, too, set in oxidized silver rims. It is one of the new Empire coats, and I'm sure you'll just love it when you see it. And I have got a new cap to wear with it that is simply the most swagger thing you can imagine. The upper part is soft, green leather and the narrow brim is black patent leather. The brim forms a visor in front and then is turned up at the sides and back, showing the patent leather——"



Courtesy of Saks & Co.

A New Empire Coat in Stone Grey Cloth Striped With a Darker Shade of Grey

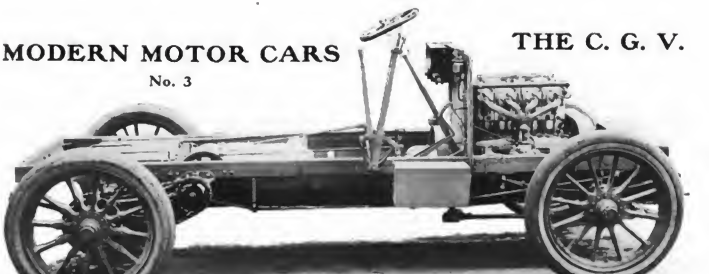
"Oh, goodness me!" interrupted Miss Elting, "isn't that Miss DePeyster closing the meeting?"

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MODERN MOTOR CARS

No. 3

THE C. G. V.



C.G.V. initials represent to conjure with in every department—road racing, touring and construction—of motordom. Charron and Girardot drove the Panhard to consecutive victories in the first Bennett cup races of 1900 and 1901, and to repeat their list of road racing victories would be to simply catalogue the name of every great European road racing contest. Charron, after his great racing successes, became a great car selling agent, forming afterwards a company with his friends, MM. Girardot and Voigt: Girardot being a man of great mechanical ability, intimately connected with every problem relating to locomotion on terra firma, on water, and in the air.

In 1901 the firm opened their model plant at Puteau, and the first 15 m.p. C.G.V. motor car was unique because it was the first motor car in which ball bearings were used; besides, its low centre of gravity, well-sprung body, noiseless, flexible motor, and a novel carburetter, which was warmed by water circulating from the jacket, marked a firm step forward in the constructing of safe and luxurious motor cars.

Externally, nowadays, owing to an apparent finality of design, all modern motor cars, like all coins, look alike to the superficial, average observer, but in the C.G.V. cars there is a detailed difference of construction that amounts to a real distinction. To demonstrate this let us examine the chassis of their new 25 m.p. car, which represents their latest production. It has been well said that a house is no stronger than its foundation, and hence in constructing motor cars a firm frame is an essential, not only because it has the whole mechanism placed upon, or, rather, hung from it, but must also bear the weight of the body, the passengers and the torque of the motor, to say nothing of road shocks.



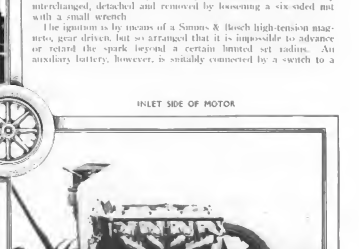
OUTLET SIDE OF MOTOR

The frame of the C.G.V., while of the *Bois de Arme* type of reinforced wood and metal combination, is distinctive because the frame itself is composed of five pieces of cold drawn, weldless steel tubing into which are forced by pneumatic pressure suitable lengths and square sections of hard wood, so that after this operation the previously round tubes assume a square sectional shape. The side members and the end cross members of the frame are dovetailed or mortised and tenoned at the corners, reinforced there by broad flat steel angle plates, which are bolted on top of and the bolts passing vertically through them, and further reinforced by wood screws set horizontally flush into the frame. On top of the frame is placed a wooden sill or transom, further adding to its thickness and strength. The third cross member of the frame back of the center carries the differential and jack shaft and also supports the water tank; the transmission case and the arms of the bed of the motor case being attached by clips to the frame. Both sides of the frame are longitudinally stiffened by toggle-jointed truss rods forced into tension by two vertical struts having threaded nuts and locknuts, which force the truss rod downward into tension, thus materially stiffening the main or compression member of the frame.

The four side springs, which are of the half-elliptic, platform type, have eight leaves each. A fifth spring is used at the rear transversely and connected by shackles to the rear side springs. Straight, square section axles are used with massive forged steering knuckles, the tubular fin radiator being hung above the knuckles and carried out on an extension of the body irons in part of the frame above the axles, out of harm's way. The steering, however, is not irreversible; the steering rod end play being regulated by a locknut holding a sleeve having ball and spring thrusts which allows the wheels full play, but yet in such a manner as not to convey the road shock to the hand steering wheel. All four massive wheels are dished, the front wheels considerably more so than the rear ones, and also raked, because of the steering nut being irreversible and to allow the steering knuckles to be brought closer to the hub, which is an obvious advantage. The whole chassis is protected underneath by a detachable steel pan, which is held in place by spring catches, making its removal very easy.

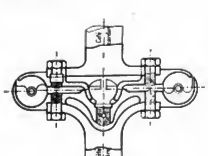
Hess-Bright ball bearings are fitted in the wheels and are also used throughout the transmission and in the side chain driving sprockets. The tires are 870 x 90 mm. front, 34 x 3½ inches, and in the rear 880 x 120 mm., 35 x 5 inches approximately. The power plant consists of four separate cylinders, the bore being 115 mm., 4½ inches, the stroke 150 mm., six inches, developing at one thousand r.p.m., 25 m.p. The valves are mechanically operated from cam shafts on each side of the motor. The steel cam shaft pinions are fitted with composite fiber and bronze teeth and are driven with the same type of pinion on the crank shaft. All the valves are on top of the cylinder heads, and are readily interchanged, detached and removed by loosening a six-sided nut with a small wrench.

The ignition is by means of a Simms & Bosch high-tension magneto, gear driven, but so arranged that it is impossible to advance or retard the spark beyond a certain limited set radius. An auxiliary battery, however, is suitably connected by a switch to a



INLET SIDE OF MOTOR

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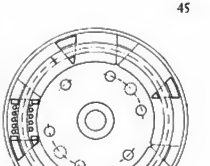


SECTION OF ELASTIC JOINTS

from short circuiting. The cylinders are set for firing in the regulation form—1, 3, 4, 2. The commutator is of the ball-bearing, adjustable type, adjustment being made internally by means of a toothed ratchet and dog. A removable nickel steel contact point is used in the commutator.

The carbureter, which is of the float feed type, is brand new and shows the tendency of the constructors towards simplicity and economy of fuel. The whole carbureter is a large one-piece brass casting in a triangular shape, the apex of the triangle being towards the sides of the motor and the main inlet branch, the float feed chamber in the rear. A brass dome, having two large circular openings, one on each side, an inch in diameter, surmounts the construction. This dome is the air inlet tube and is arranged telescopically, so that by raising and turning the outer portion of the shell by means of a knurled cover on the top, the correct amount of air may be admitted, the sliding tube being held in position at its base by notches resting on a set screw, the idea of the construction being that when once this air opening is set at the works that it should remain permanently so, the throttling of the gasoline only being done by means of an accelerator pedal and the small ratchet hand lever on top of the steering wheel. Two of what might be termed peepholes, one-half inch in diameter, are on opposite sides of the top of the main plate of the carburetor, one on each side of the air dome, and these openings are covered by movable spring discs, the object of these openings being to aid in setting the valve for the necessary air pressure; but when the carburetor is in use these peepholes are, of course, completely closed by the spring covers. The carburetor really has two feeds, one for fast and one for slow speed. The small curved pipe adjoining the air dome forward, as shown in the illustration of the carburetor, has two small holes in it, and when the motor is slowed down the feed of the large carburetor is thrown out of action, and the small feed of this pipe remains in play, controlled by means of a butterfly valve, the result being that the motor can be run as low as 100 r.p.m., the net result of the whole construction being a great economy of fuel and remarkably pure and clean exhaust, showing that the mixture at all times is intimate and correct, according to the speed of the motor and the power demands on it. The inlet branch from the carburetor to the valves is large, with easy curves and bends, and is readily removable for inspection. The guide stem on the float feed is covered by a thimble attached to a light chain so it cannot be lost, the thimble preventing any dirt or foreign matter from getting into the carburetor by way of the guide stem passage. The carburetor is water-jacketed and heated by water taken directly from the top of the motor, as shown in one of the illustrations, a shut-off cock being arranged so that in warm weather the supply of warm water can be moderated.

The water and oil pumps are both on the left side of the motor and are gear-driven, the ends of the driving shafts having a bifurcated arm, that on the water pump being larger than the one on the oil feed, and these rotating arms drive the pumps by impinging or striking on flat steel springs. Should either of the pumps become clogged, or the pressure become too great, the water and oil would be returned without going through the pumps, and a further excess of pressure would result in breaking the springs, the idea of this being that the pumps will not be injured by over-pressure or clog in the feeds. The oil pump takes the oil from the tank and feeds it into a multiple drip coil on the dashboard and so arranged that the motor can be started with either the magneto or the battery, a peculiarity of the ignition device being, however, that the spark can be advanced or retarded from the battery only. All the electric wiring, as the illustrations show, excepting a very small portion of it, is thoroughly encased in tubing to protect it



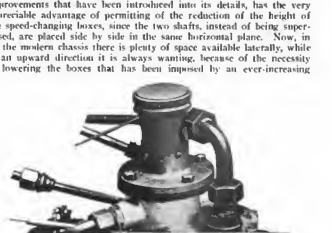
HALF END VIEW OF ELASTIC JOINTS

lubricator on the dash, which is connected to the motor and cam shafts.

Control of the whole power system is by two notched levers on the top of the steering wheel, which regulate the gasoline supply and the ignition, by two foot pedals, one auxiliary foot pedal, one side lever operating the four speeds and reverse change-speed gear mechanism and another the emergency brakes of metal to metal, with expanding segments, acting on the rear wheels, the regular internal acting metal-to-metal brake being operated by one of the foot pedals working on a large drum on the differential; the brake and the throttle being connected so that on raising the foot to apply the brake the throttle is partially closed and the speed of the motor reduced.

The supply of gasoline and oil is carried under the operator's seat, the water tank being underneath the body in the rear, but an ingenious water tank filler is provided in the foot board on the left side. A valve is arranged here for filling the tank at this point of the car, and so designed that in case of necessity the water can be shut off entirely from the motor.

The arrangement of the new gear box, which is peculiar only in the improvements that have been introduced into its details, has the very appreciable advantage of permitting of the reduction of the height of the speed-changing boxes, since the two shafts, instead of being superposed, are placed side by side in the same horizontal plane. Now, in all the modern chassis there is plenty of space available laterally, while in an upward direction it is always wanting, because of the necessity of lowering the boxes that has been imposed by an ever-increasing



NEW DOUBLE CARBURETER

speed. The direct gearing, therefore, contributes toward the reduction of the mechanical noises of the car and permits of the establishment of very low, and, consequently, very stable chassis without any part coming dangerously near the ground.

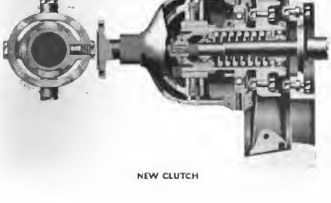
The apparatus consists of two horizontal and parallel shafts, viz.: (1) the primary shaft, which begins at the point that enters the flywheel of the motor, and terminates, in cylindrical form, in the interior of the bevel pinion; (2) the secondary shaft, of which the extremities revolve in ball bearings. The first shaft, which is square nearly its whole length, carries a sliding gear of three wheels, which the fork causes to travel over this part. It likewise carries, but loose upon it, a stationary gear composed of a wheel, operatively connected with the bevel wheel.

The secondary shaft carries four gearings, screwed laterally, one of which remains constantly in mesh with the stationary gear. The result is that through these gears all the speeds except the high one pass from one shaft to the other. In order to obtain the first speed the wheel of the first shaft is made to engage with that of the second, etc.

In order to obtain the fourth speed, in direct engagement, the sliding gear is moved backward until the lugs carried by the primary shaft engage with suitable recesses. By this means the gear is at once operatively connected with the primary shaft and revolves with exactly the same velocity as the motor shaft itself. This secondary shaft, always actuated by the meshing revolves idly in the oil. The backward running is obtained through the displacement, due to a fork beneath, of two pinions interposed in the low speed combination.

The line drawings show a half-view and section of one of the very ingenious C. G. V. elastic joints. The apparatus, dismounted, comprises two caps, one of which is operatively connected with the first driving shaft and the other with the receiver that actuates the cardan joint. Each of these caps is provided with four webs in each of which

(Continued on page 86)



NEW CLUTCH

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A Gasoline Railroad Inspection Car



BY H. B. FULLERTON

ITS CHAFFEUR, SPEEDY SMITH

ITS GARAGE AT JAMAICA

"Bless me! this is pleasant,
Riding on the rail!"

WAS the jolly expression of the genial wit and versifier, John Godfrey Saxe, long before motor cars for practical use were evolved. The latter-day motor car globe-girdler Glidden has also had occasion to repeat Saxe's lines.

Out West some of the railroad companies use motor cars, and abroad, and in England and on the Continent, the thin edge of the wedge of the individual unit motor car has also entered. Here in the East, however, the vile steam locomotive still lingers.

The Long Island Railroad Company has, however, electrified its lines as far as Jamaica, and during the last few weeks, for the first time, it has moved passenger cars electrically propelled over that part of its road. If the financial results of the arrangement justify the expectations we may expect that before long all the passenger traffic on the Long Island Railroad will be so moved. Even the New York Central Railroad proposes to do the same thing on its line for local traffic between its stations in the Borough of Manhattan and Croton.

Less than half a decade ago a great railroad operator said that at the expiration of ten years a steam locomotive in operation would be a scarce thing, and that when one was located it would be found on some small, out-of-the-way railroad where electricity at a low price could not be obtained, and where gasoline was scarce and high-priced. That statement was a far-seeing one, but true.

Indeed, it seems the very irony of fate that just when we are about to celebrate the seventy-fifth anniversary of the introduction of the steam locomotive and the centenary of the steamboat, some other source of power, which at present looks like the cylinder-fired gasoline motor, should supplant steam as a prime mover. That the individual unit motor car will have an effect on the present form of transportation is certain. Every great railroad operator has long realized that before long trains of cars will be obsolete; that single cars of great capacity, having their own self-contained power plants, will run at more frequent intervals and very much faster, and that time-tables will henceforth be a thing of the past so far as the traveling public is concerned, the despatcher's office only being interested in them.

The factor of safety is always a prominent one in the minds of the masters of railroad transportation — not the mere mechanical factor of safety which deals with loads, strains and stresses, and tensions and tortions, but the physical safety of the traveling public.

Always the safety of the passenger occupies first place when railroad problems are being solved; secondly, comes prompt and rapid movement of the trains, and, lastly, the luxury now demanded by a rapidly increasing number who travel by rail.

Devices invented for the sole purpose of further safeguarding of the traveler are continually being tried and, when their practicability is assured, adopted promptly.

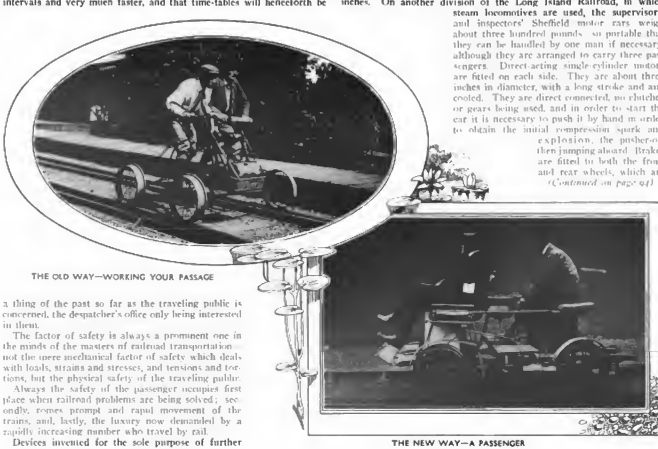
The roadbed of a railroad is the foundation upon which must rest the safety and comfort of the traveler. It is guarded with the greatest care, and laid out in sections, with a gang of men continually patroling and examining every detail of ballast, tie, rail, switch and signal. Over them are skillful, thoroughly posted supervisors in close touch with the Engineer of Maintenance of Way and Chief Engineer. Vigilance is continual, not to say keen, and to assist the engineers to cover in person or by proxy a large system much skill has been exercised in developing the hand-car of the early days. At first this necessary vehicle was a small platform on low wheels pushed by hand by men who walked on the ties; later, the lever was utilized and a big gain in speed and power secured. Then came the velocipede cars, and both hands and feet were used in propelling a lighter car.

Improvement was not very rapid until the gasoline engine was adopted, hence the track motor car is now a valuable assistant to the men in charge of the roadbed and its details. It ensures frequent inspection and makes certain continual and close supervision of all points possible without exhausting labor to cover the road.

The Long Island Railroad quickly adopted the motor car, as it did the rotary snow-plow and that dust-subduer, the roadbed inlet, so that now under J. B. Austin, the Engineer of Maintenance of Way, are gasoline motor cars for the supervisors, and are also for his personal use, giving him and his staff absolute independence of movement.

On the electrified division of the Long Island Railroad for inspection and patrol of the electric equipment two of the well-known Oldsmobile railway inspection cars are used. These carry six men with their tools, and, although the cars weigh only seven hundred and fifty pounds, they are good for forty miles an hour. The cars are equipped with 4½ m.p. single-cylinder motors, the length over all of the cars being ninety inches. On another division of the Long Island Railroad, in which steam locomotives are used, the supervisors' and inspectors' Sheffield motor cars weigh about three hundred pounds, so portable that they can be handled by one man if necessary, although they are arranged to carry three passengers. Direct-acting single-cylinder motors are fitted on each side. They are about three inches in diameter, with a long stroke and air-cooled. They are direct connected, no clutches or gears being used, and in order to start the car it is necessary to push it by hand in order to obtain the initial compression spark and explosion, the pusher-off then jumping aboard. Brakes are fitted to both the front and rear wheels, which are

(Continued on page 94)



THE OLD WAY—WORKING YOUR PASSAGE

THE NEW WAY—A PASSENGER

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THE JUMP SPARK

BY HIRAM PERCY MAXIM

IT would be hard to find anything on a motor car more innocent and simple in external appearance than the little "bougie" or spark plug. Yet nothing on a motor car approaches it in tremendous possibilities and scientific interest. It is the basis of our wireless telegraphy—one of the most complex of our modern scientific devices.

When the question of igniting the charges in the cylinder of a cylinder-fired gasoline engine came up the electric spark was at once thought of. The simplest electric spark, of course, was the one produced by simply snapping two wires. But it involved what was at that time considered a very objectionable mechanical complication to suitably and practically accomplish the snapping of these two wires inside the hot cylinder of a gas engine every time its charge required exploding. The wires or sparking terminals burned off, the moving parts failed, air leaked where they passed through into the cylinder, the amount of electricity required quickly used up the batteries, and all manner of difficulties presented themselves.

To avoid these, the early builders bethought themselves of the "jump" spark. Here was a little spark which required no snapping of terminals apart, required no mechanism on the engine other than a simple "bougie" or plug screwed into the engine cylinder. At a stroke, all of the mechanical complications of every sort were avoided. The responsibility was transferred to the electrical apparatus which generated the "jump" spark. Thus it was that the jump spark came into use.

While the "make and break" or "snap" spark came in again later it never displaced the "jump." To trace its development, step by step, is not only extremely interesting, but really a liberal education to the modern motorist.

The spark as we find it at our spark plugs seems to be a little shower of separate sparks. There are apparently hundreds of them playing between the sparking points, and they continue to play as long as the contact in the "timer box" is "on," which is the same as saying during the interval that the spark is "sparking."

Each one of these little sparks consists of a minute quantity of flaming vaporized metal from the spark points. The electric discharge actually melts off and boils into vapor a minute quantity of the metal of one of the sparking points and deposits most of it upon the other sparking point. One of the points, in other words, actually grows under an electroplating process at the expense of the other.

A series of these little flames following each other in the most rapid succession produce what approximates a steady flame, which, being so small, we call a spark. It is this little bit of fire which we use to kindle the gasoline vapor in the engine cylinder and produce for us a power stroke.

If we trace back the wire which brings the electrical fluid to the spark plug we find that in the majority of cases it leads to a terminal on a highly polished and mysterious box of attractive external appearance located upon the dashboard of the motor car. From this terminal, if we look into the box carefully, we find another wire leads. This wire is an extraordinarily fine one, in fact, as fine as a human hair. Followed to its abiding place, we find that it leads to a coil of many thousands of turns of wire of an equally small size. After passing through this seemingly interminable coil it leads back to the exterior of the box again to another terminal. From here a connection leads to the body of the engine itself—or "ground," as we term it. We realize that this is merely a simple way of completing the electrical circuit through the spark plug, since one of its points is fastened directly in the body of the plug and the plug is screwed into the engine. A complete electrical circuit is thus apparent and represented by the fine wire circuit in Fig. 1, viz., from one end of the fine wire coil to the central wire of the spark plug, across the spark gap to the body of the plug, through it and the engine body and back to the other end of the fine wire coil. As far as any apparent source of electrical supply goes, such as a battery or a magneto, it seems to have none, or even any ordinary connection leading to one.

Inside of the coil of fine wire we notice, however, another coil. It is of much coarser wire. The two coils, while evidently wound one over the other, are separated, evidently with the greatest pains, for wax and paper *ad libitum* are used to insure their insulation from each other. Obviously, no electricity is intended to pass directly from one into the other.

Investigating the coarse wire coil we find it connects to a battery, and in the peculiar manner shown in Fig. 1. One end of the coil leads to a battery carried under the seat of the motor car. The other end of the coil leads to a little vibrating blade on the top of the box. Just touching this blade a little adjusting screw provides an electrical path out of the blade to a wire which leads to an insulated contact on the "timer" box. And here the scent seems to end, since no metallic path for the electricity leads out. But let us turn the engine over. On the sparking centre we have the trail again. A little contact has come around and touched the insulated contact and the electrical path is again provided. The electricity is led directly into the body of the engine—or "ground," as it is called. The battery has one of its terminals likewise connected to some part of the engine or frame and thus the electric circuit is completed, as in the case of the fine wire.

To state more briefly: Starting out from one end of the battery the electric current traverses the coarse wire coil, then via the vibrator blade and the timer box to the so-called ground and back to the other end of the battery via the "grounded" battery wire. When the contact comes around in the timer box it is plain that electricity can flow from the battery through the coarse wire coil.

But now a question arises in the unsophisticated mind at once. Even though the electric current may get into the coarse wire from the battery, how does the current get into the fine wire to make the spark, since the latter has no connection with the former?

We noticed that the superimposed coils of coarse and fine wire had for a core a little bundle of iron wires. We also noticed that the little vibrating blade had a small piece of iron attached to its end and so located that it came very near to but did not quite touch one end of the iron wire core.

Now, it is one of the mysterious properties of iron that when the latter is surrounded by a coil of wire which carries an electric current it becomes magnetized. Its ends will attract other bodies of iron. But also, since nature usually ordains that a rule must work both ways, a coil of wire surrounding an iron core which is caused to become magnetized will in turn generate an electric current. The coarse wire coil takes the feeble electric current from the batteries and magnetizes the iron wire core. The iron core, being magnetized, regenerates or "induces," as it is technically termed, a secondary current in the fine wire coil. The trick is done at once. The current induced in the fine wire coil is combined to the spark plug and, jumping the gap, makes the much sought spark.

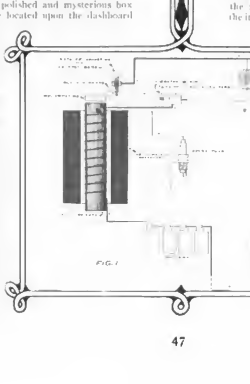


FIG. 1

But now we may ask, why is this roundabout method employed? Having the source of electric current in the batteries, why not connect them directly to the spark plug, through the timer box, and avoid all the complication of two coils? The reason is that the battery current is not of a feeble a pressure to "jump." It must have not only a complete metallic circuit or path in order to flow at all, but it must have a very good one, else it does the trick. As for jumping an open gap, it could not accomplish such a thing. But if we put in the iron core, and cause the core to be magnetized we can make it generate any kind of a current

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we want. By winding on turns enough we can make it of high enough pressure to create a disturbance which can be felt and recorded many miles away—which is wireless telegraphy—or we can wind only enough to make it jump the gap of a spark plug.

This accounts for the two coils. But what about the vibrator blade and that other mysterious combination of tinfoil which we notice connected to the coarse wire circuit?

If we could watch the induced current in the fine wire coil we would find that it was highest when the magnetism in the iron core was changing in intensity. Rising from no magnetism to full magnetism causes a certain current to be generated, or falling from full magnetism to no magnetism causes a certain current to be generated. Another thing peculiar is, that the more quickly or suddenly the change, the greater the current induced. This gives a clue to the reason for the vibrator blade.

The magnetism may not be easily made to rise suddenly, since our source of current is rather weak at first. But once up, it can be broken with any degree of suddenness we wish. While we may not be able to build it up suddenly, we certainly can break it off suddenly. This is just what the vibrator does. The instant the magnetism rises to a fair value in the iron wire core the piece of iron on the end of the vibrator blade is attracted down and the contact between the blade and the adjusting screw is pulled away and the circuit broken. The current in just what we need to absorb the electricity which persists in following the spark when our vibrator blade opens the circuit. The current that would persist in the spark is absorbed and the interruption becomes sparkless and practically instantaneous. With this instantaneous interruption we get an instantaneous rush of induced current in the secondary of such intensity that it jumps the gap between our spark points and produces a beautiful little flash of fire.

The Fig. I shows how the condenser is connected with relation to the vibrator blade and its little interrupter. Every time the piece of iron on the vibrator blade is pulled down the circuit of the coarse wire coil is interrupted, the condenser standing by and seizing the persisting current which tries to follow. The interruption once made, and the magnetism of the iron core, of course, being interrupted with it, the vibrator blade returns to its normal position against the contact. But this remakes the circuit, and instantly the vibrator blade is pulled down and performs another interruption. This repeats itself and goes on at whatever speed the vibrator can vibrate. A stiff vibrator will fairly sing, it will make and interrupt so rapidly. It will move so rapidly that to the eye it seems to be standing stationary. Yet in spite of its tremendous speed all of the complex functions we have traced through are performed every time, and every time it vibrates it makes a spark jump, and it is all these jumps which account for the "shower" of sparks we notice. Such is the theory of our spark coils.

FIG. 2—A POPULAR FORM OF COIL FOR FOUR CYLINDER ENGINE REPRESENTATIVE OF THE SIMPLEST TYPE, AND SHOWING THE DIFFERENT ELEMENTS IN THEIR SIMPLEST FORMS

FIG. 3—ANOTHER FORM OF COIL WHERE THE ATTEMPT IS MADE TO MAKE THE TENSION-ADJUSTING SCREW THE MOST CONSPICUOUS. THIS COIL HAS A VERY ELABORATE ARRANGEMENT TO GIVE DELICATE TENSION-ADJUSTMENT

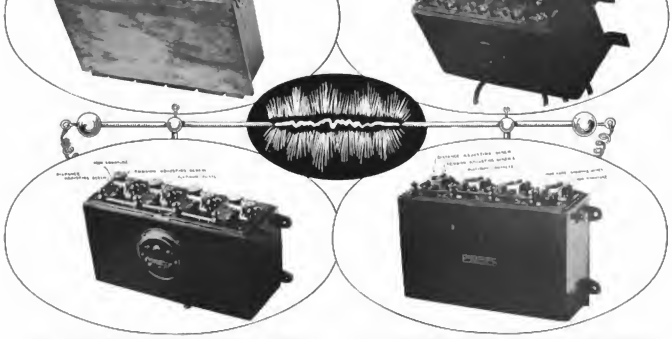


FIG. 4—A FORM OF COIL IN WHICH AN ATTEMPT IS MADE TO HAVE THE TENSION-ADJUSTING SCREW MADE MORE CONSPICUOUS THAN THE DISTANCE-ADJUSTING SCREW

FIG. 5—IN THIS COIL THE IRON WIRES OF WHICH THE IRON CORE IS COMPOSED IS VERY PLAINLY SHOWN. THE VARIOUS ELEMENTS ARE SHOWN IN A VERY DIRECT AND EASILY UNDERSTOOD FORM

the coarse wire coil and the magnetism in the core, of course, falls to zero. On its face this looks entirely all right and accounts for the vibrator and its parts. But what about the tinfoil arrangement which is connected in at this place?

It so happens that when an electric current is interrupted it resents the interference and does its best to overcome it. When the current has been flowing in a coil of wire around an iron core it still more strenuously struggles to persist. This persistence appears in the form of a spark, which has just enough conductivity to permit the current to die down to zero comparatively gradually.

This will not do, as we have seen, and something must be done to instantaneously crush the current and the following spark. This is just what the little tinfoil arrangement does.

This tinfoil, or condenser, as it is called, is made up in sheets, each sheet being separated and electrically insulated from its next neighbor by oiled paper. Every alternate sheet is connected together to form one group, while the remaining alternates are connected into another group.

This amounts roughly to a pack of tinfoil sheets so arranged as to make two separate groups of sheets; the sheets of each group being interlaced between the sheets of the other, but electrically insulated therefrom.

It is a peculiarity of metal sheets arranged in this manner that they will become electrified or charged with electricity, and will hold this charge until a path is provided for its discharge. This, of course, is

If the principles which govern the operation of a device are understood the device seems somehow to work better. We allow for it to a certain extent, and any adjusting that is done is intelligently done. The spark coil is one of the most prominent examples of this. Nothing, unless it is the carburetor, comes in for more blame and general tinkering, when anything goes wrong, than the spark coil and its appurtenances. Everything from an empty gasoline tank to a pair of flat rear tires has been laid at the door of the spark coil, and the correction of these difficulties has frequently been attempted by the readjustment of the latter.

Anything that will serve to ameliorate these conditions is therefore of general benefit. In view of the foregoing expositions of the principles of the spark coil, it may be that a discussion of some of its practical details will be opportune.

Distance Between Sparking Points—The fine wire coil in most spark coils is usually made with enough convolutions or turns to cause the induced current to have a high enough pressure to jump approximately ½ inch in the open air. It takes, approximately, 30,000 volts' pressure to force through this amount of air. If there is any other easier way for the current to get across to the other wire than via the sparking points it accepts it. If the distance is 1-32 of an inch it only requires about 2,000 volts. The tendency to leak across at places other than the sparking points is under this pressure far less. Under this

(Continued on page 76)

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The Car of the Tire Test.



THE six days' tire test at Long Branch, which was certainly an original American idea, was a practical one, and that it was needed is evidenced by the fact that the Automobile Club of France is now engaged in promoting a race solely for tires. If one must dance one must pay the piper, for the motor car obviously would not exist in its present type were it not for the pneumatic tire, and yet the pneumatic tire in its present form is at once a paradox, for rubber and fabric, while making the best known combination for tire use, are at the same time the worst materials that might be used. The great road racing events of the year, and some of the touring events also, have shown that our cars are too fast for the tires, and that if we insist upon enjoying the pleasures of the pneumatic tire we must also insist upon paying its penalties. Not but what pneumatic tires are better today than they ever were, but owing to the high speed of our modern cars the strains and stresses on them are greater than they ever were before. It is true that a large part of this trouble is due to and caused by the fact that we do not use tires large enough in cross section diameter, the only objection to their use being their ungainly size and their large cost.

One of the great problems tire makers have to contend with is the amount of heat stored in the rubber, which in great races over the Auvergne and Ardennes courses was so great that the rubber actually peeled off the canvas. The problem, then, lies in the direction of finding some way to disperse and radiate this heat. Hence we need tests.

Four new models of the Maxwell cars were used in the Long Branch test such as will be produced by the makers during 1906 and sold for $1,400. One car was equipped with Morgan & Wright and Continental tires, another with International and Diamond tires, a third with Goodrich and G & J tires, and a fourth with Hartford clincher and Pennsylvania tires. All the tires wore well, hence it seems invidious to draw comparisons, although the committee in charge of the test, with the data before them, justly awarded the trophy to the Continental tires. During the six days of elapsed time, the four cars were on the course a total time of about 144 hours and 30 minutes, and at the conclusion of the test were driven from Long Branch to Tarrytown, a distance of about 100 miles, and adding the total time of this trip to the test, the gross elapsed time was about 156 hours, the total mileage being about 1,840 miles. The tires being all of the familiar types, little need be said here in describing them, but as the cars to which they were fitted are a new model a description of them is pertinent and interesting at this time.

The motor in the new Maxwell, Model H, is of the horizontal double-opposed cylinder type, 5" x 5" in size, fitted with mechanically operated interchangeable valves, giving 16 motorpower. The timing case is separate from the engine case on which it rests and by the removal of six bolts it can be lifted off, exposing the connecting rods and wrist pin bearing. The engine case and the transmission case are one, of an aluminum casting, and hung on a three-point suspension. The cylinders and head are water-jacketed and cast integral.

The motor bearings are bronze shell, babbitt lined, the bearings in the transmission case being also babbitted. The transmission case is divided into two compartments, one for the clutch and the other for the gears. The fact that the gear case is one piece with the engine case and yet separated by a partition from the clutch compartment makes possible the use of a heavy grease, just enough heat being transmitted through the casting to keep it at the proper consistency.

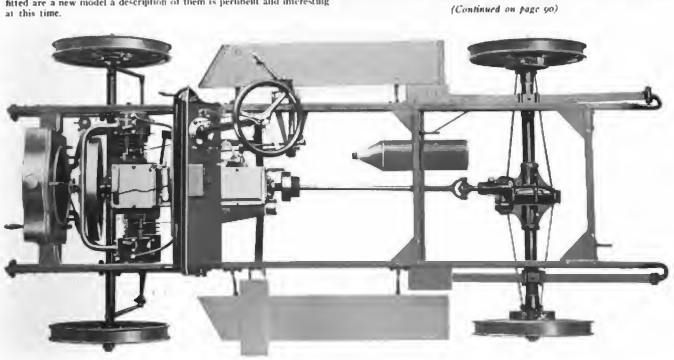
The motor is water cooled, the circulation being effected by the "Thermo-Siphon System," which does away with circulating pumps and their attendant troubles. The cooler is of the honeycomb type, reinforced by a powerful fan driven by a belt from the crank shaft.

All the important bearings are fed by a sight feed oiler, mounted on the dash. The cylinders are oiled positively and do not depend upon the splash for their lubrication. The clutch chamber, also, is fed by a sight feed oiler.

The clutch is of the multiple disc type, having six hundred square inches of friction surface. It operates in oil, which thoroughly works in between the discs and the clutch, and on engagement of the clutch all the oil must be squeezed out before it will seize. Thus a certain amount of slip occurs, which releases the strain on the driving mechanism in starting, the oil filament at the same time preventing wear on the metal discs, which are hardened and ground, as are also the cams. The discs are held in engagement by a powerful spring, and the thrust, when the clutch is released, is supported by twenty-six steel balls held in a suitable retainer.

The transmission is of the sliding gear type, having three speeds forward and one reverse, with a maximum speed of thirty-five miles. All gears are drop forged, and cut and hardened. The three forward and one reversed speeds are controlled by one lever; the clutch and the emergency brake being combined in a second lever. The usual foot clutch

(Continued on page 90)

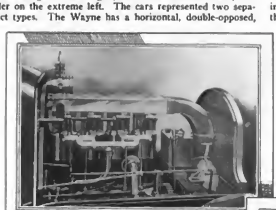


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Cars of Economy *and* Endurance



WITH a hilarious profligacy and almost reckless abandonment of philology, promoters and public alike have recently dubbed every motoring affair and function a carnival. Now a carnival is, and never was anything other than a final feast before a fast. Speaking ecclesiastically, a gross indulgence to the flesh before entering on the penitent term of Lent; but as most of our motoring entertainments are fast ones, and wholly devoted to speed, that is probably what the promoters have in mind, a combination of feast and fast. Although speed has heretofore not been regarded as a co-efficient of an economy and endurance test, the Long Branch test embraced all three of these factors. Only a trio of cars faced the starters at midnight, the Wayne, as shown in the flashlight on the right; the Corbin in the center, and the Frayer-Miller on the extreme left. The cars represented two separate and distinct types. The Wayne has a horizontal, double-opposed,



INLET SIDE OF FRAYER-MILLER MOTOR

water-cooled motor, and the Frayer-Miller and the Corbin both have vertical, four-cylinder motors, air cooled, but even these two differ in their methods of cooling, as will be shown later on.

The Frayer-Miller, which won the test, had a couple of stops, but kept on and made 1,866.4 miles without a stop. Its official mileage was 2,915 miles in 143 hours and 46 minutes. Its gross total mileage, 3,202, in 159 hours and 24 minutes. Its non-stop mileage, 1,866.4 miles, in 96 hours and 53 minutes, using 211 gallons of gasoline and ten gallons and one pint of lubricating oil. The Corbin car, which was second in mileage, covered 2,321 3-10 miles in 143 hours and 37 minutes, and used up 190 gallons of gasoline and 29 gallons of lubricating oil, while the Wayne covered 1,902 8-10 miles in 145 hours and 2 minutes, and used up 134 gallons of gasoline and 31 gallons of lubricating oil. The Corbin and Wayne cars stopped at midnight at the end of the six days' run, but the Frayer-Miller continued on until 3.30 p.m. the day following, Sunday.

The Frayer-Miller air-cooled car embraces no untested ideas beyond the means of cooling. It is an axiom that an air-cooled motor must depend largely on convection—that is, the actual contact of air in motion for the dispersion of heat from the cylinder surface—and it appears to be obviously true that by the ordinary method of throwing air on the cylinders by a vane fan, that the air does not always reach the place it should. In the Frayer-Miller the cooling is effected by an air blast from a centrifugal blower, as the illustration shows, located in front of the motor and driven by direct gearing from the main shaft. This air blast is carried in a square bus-pipe to the cylinder heads, which are surrounded by an aluminum jacket open at the bottom, and having an annular space of one-fourth inch between the outer walls of the cylinder and the inner walls of this jacket. At normal speed a current of air is forced through this pipe around the cylinder heads and walls and inside the aluminum jacket at a pressure of about two ounces per square inch. The cylinders are 4¼ bore by 5¼-inch stroke. The inlet and exhaust valves are located on opposite sides of a central chamber raised in the cylinder head, which is just wide enough to allow movement of the valves so that a fresh charge has to be drawn across the exhaust valve head, thus helping to cool it. That this system does cool was demonstrated at the conclusion of the six days' test, when immediately after the final stop one of the sparking plugs was removed and spectators handled the plugs freely without danger of scorching their hands, so cool were the plugs. The pipe which carries the air to the jackets in the blower is fitted with removable hand plates fastened by wing nuts, so that access may be readily had to the spark plugs.

The crank case is of aluminum and the bottom is so designed that it may be taken down for inspection of the connecting rod bearings, without disturbing the crank-shaft. The crank-pin bearings are of bronze, in gridiron form, a center bearing being fitted to the engine. A one hundred and forty pound flywheel, eighteen inches in diameter, is used, having a clutch ring bolted to it, the clutch grabbing outwardly. The clutch facing is of mineral leather, and



EXHAUST SIDE OF FRAYER-MILLER MOTOR

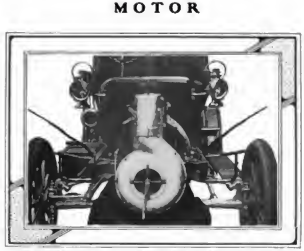
its gripping power is from a helican spring riding on a ball-end thrust when the clutch is free.

The motor is governed by a fly-ball centrifugal governor, which is placed on the gear driving the blower, and revolving at the same speed as the motor. A governor acts directly on the throttle, and is so arranged that the speed of the engine is advanced by compressing a spring on the throttle rod, and not direct from the throttle, so that the engine

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is always in the governor speed, excepting when the quadrant lever is thrown clear forward, and the throttle is held wide open.

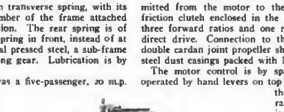
The carbureter is an ingenious one of the float-feed type, the gas spray nozzle being single opening. Hot air is drawn from underneath the air jackets, and a cold-air auxiliary is supplied to the head of the throttle which is located some distance from the carbureter. The spray nozzle is surrounded by a disk having a center opening, which remains constant, outside of which are two fan-shaped openings partially covered by horizontal fan-shaped plates, so that the carbureter is adjusted by the extent to which this fan-shape opening is covered by the plates.



AIR BLOWER, FRONT AXLE AND SUSPENSION, PRAYER-MILLER CAR

Three speeds forward and one reverse are arranged with direct drive on the high gear, all controlled by a single lever, the changes being made by five gears, the reverse being one-quarter of the high speed; the low speed is one-third of the high speed; the second gear is two-thirds of the high speed and the high speed is direct at the speed of the motor. A universally-jointed propeller shaft drives the live rear axle through bevel gears. A two-inch tubular front axle is used. The front knuckles are carried on Timken roller bearings. The front spring is a plain transverse spring, with its ends on the axle, and the front cross member of the frame attached to the center, giving a three-point suspension. The rear spring is of the modified platform type with the cross spring in front, instead of at the rear, as is usual. The frame is the usual pressed steel, a sub-frame carrying the motor transmission and steering gear. Lubrication is by eight feed Hill precision oiler.

The Wayne model C used in the test was a five-passenger, 20 m.p. light touring car, weighing 1,600 pounds and costing $1,250. Its power plant consists of a horizontal double-opposed cylinder motor of 5¼" by 5", located longitudinally in the center of the chassis, giving a low center of gravity. Each piston has three ¾" rings, insuring close compression; the hollow piston pin is held in the piston by a taper pin passing through the pin in the hubs of the piston, secured by a split cotter pin, which prevents the pin from working endwise or revolving.



WAYNE MOTOR

A novel feature of the motor is that it is water cooled by means of an individual pump from each cylinder, nearly all other makes having but one pump for the cylinders. The transmission is of the planetary type, having three triple gears instead of the usual two, a single chain drive being used. The flywheel is firmly bolted and pinned on the crank shaft, giving a firm receptacle for the transmission drum which operates against and in connection with the flywheel.

An automatic device which covers the end of the main shaft when the spark lever is thrown forward prevents false starting, is so arranged that the starting crank cannot be inserted. Brown-Lipe balance differential gears are used, and are pinned to the axle. The pressed steel frame is 120 inches long and 22 inches wide, the corners braced with steel corner plates. The center braces are also the engine and transmission supports. The frame is hot-riveted, and at the front is placed the radiator, back of which are the electric equipment and gasoline tank, all under the hood. The spark advance and throttle are on the steering wheel. Expanding hub brakes are used, controlled by the left foot pedal. To prevent the locking of one brake before another, an evener is used so as to insure simultaneous braking on both brake drums.

The steering is by means of a rack and gear device, placed on a rod leading from the steering wheel, and furnishing a direct drive to the knuckle rod, and from there another rod conveys the power from the steering wheel to the opposite knuckle, the rods being linked by means of two globe joints.

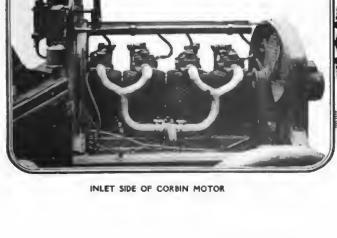
The Corbin test car was a model D, with a four-cylinder, air-cooled motor, rated at 16-20 motorpower, and costing $2,000.

The motor has four vertical cylinders of 3¾" bore, mounted lengthwise of the chassis. The cylinders are cast separately, with vertical valves fitted in detachable cages in the cylinder heads. The inlet valves are automatic. The crank runs in five bronze bearings, the connecting-rod bearings being adjustable and accessible through yoked cover plates in the right side of the crank case. The cylinders are cooled by the Corbin patented system of inserted soft steel combs, and forced air by means of a belt-driven fan at the front of the motor. Power is transmitted from the motor to the change-speed gear through a conical friction clutch enclosed in the flywheel. The change-speed gears give three forward ratios and one reverse, the third forward gear being a direct drive. Connection to the rear-axle pinion is made through a double cardan joint propeller shaft, the joints being enclosed with sheet steel dust casings packed with lubricant.

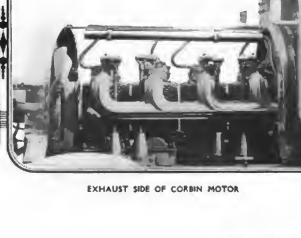
The motor control is by spark and throttle, both functions being operated by hand levers on top of the steering wheel. A hand lever at the right of the operator controls the speed ratios. There are two brakes. The service brake is foot operated, a depression of the pedal closing an exterior band on a drum on the propeller shaft. A hand lever operates interval expanding brakes on the rear-wheel hubs, at the same time disconnecting the clutch.

The wheel base is 94 inches, tread 56 inches; 30-inch wheels are used, shod with 3½-inch tires, the front wheels being mounted on Timken roller bearings. Springs are semi-elliptic, the fronts being 38" by 1¾", rears 45" by 1¾" wide. An enclosed shaft drive rear axle is used; the driving gears are of hardened steel, the driving pinion has 16 teeth, of six-pitch, 1¾" face, the shaft and gear blank being machined from a solid forging. The driving gear is keyed and bolted to the differential housing, the whole being mounted on Timken roller bearings. Both ends of the steel driving shafts are squared, one end fitting the broached hub of the bevel differential gears, the other the rear-wheel hub. The bevel-gear casing is split in the horizontal plane, the upper half being removable for access to the working parts within the casing. The frame of the car is of channel-section steel, with hand-forged steel spring hangers. It has no subframe, the motor and transmission being mounted on cross supports fitting into sockets riveted to the main side bars of the frame.

The contention that air-cooled motors do not hold compression was not substantiated, because on the last three days of the test, runs were made in 97 minutes, which equals the best times at the start.



INLET SIDE OF CORBIN MOTOR



EXHAUST SIDE OF CORBIN MOTOR

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THE MOTOR-BOAT "EXPRESS"

Portraying the Trend of the Industry

By Thomas J. Fay, E. E.



"A CORNFIELD without a scarecrow will be chuck full of crows" and with a superbundance of crows comes a famine of corn. Likewise it may be said, in relation to motor boats: A scarecrow or the equivalent will tend to limit the purely useless creations. That the foreign builders have furnished a full supply of scarecrows is regrettably plain from the performances at the recent events abroad. Regrettable, to be sure, for to note, if possible, the reasons of accidents and failures is far from delightful to the historian.

Motor boats must be speedy to be noteworthy, but designers who dispense with freeboard, reduce stability to the vanishing point and build boats with scarcely any strength, considering the service and its hazards, "are on the wrong tack off a lee shore." There is but little, if any, display of skill in any of the unseaworthy fast motor boats, for the reason that they are really not fast excepting on a millpond or what amounts to the same thing. Within a land-locked harbor in a calm there must be at least a showing of utility in even a racing boat, else to class it as a scarecrow is to be wise, provided it serves for designers as a guide in the land of *What not to do*.

Racing boats are but passing freaks, unless they are advance guards of types of boats that in the course of events will serve in the cause of humanity in a manner consistent with the seriousness of our cruise upon the waters of the earth.

That motor boats can be designed quite free from freakish tendencies, with ample freeboard, adequate stability and great strength, is as sure as it is that Satan will be good while his tail is in the door. There are counts for much more than mere sport in the long run. Contemporaneous with the production of these strictly racing boats, each one was a goodly amount faster than the other.

In the order of their creation, the *Express* type of boat has been developed, one of which was launched last month. This craft, while in itself a fast boat, with racing lines, will do more than annihilate space; stability, seaworthiness, and endurance being leaders in its list of attractions. The hull (Fig. 1), from lines by the well-known firm of Tams, LeMoine & Crane, was built in the yard of the Smith & Mabley Manufacturing Company, and, as the figure shows, the hull is not unlike the *Challenger*, excepting that the *Express* is designed to be a very dry, stable craft, with a view to utility, so that extreme speed may not be expected. But that the *Express* will do a fine burst of speed is beyond gainsaying, especially considering the fact that she is fitted with machinery that is the duplicate of the *Challenger* motor equipment, excepting that the auxiliary equipment is modified to accord with the requirements of express service.

The motor is of 150-motorpower, of the well-known *Simplex* type, constructed in the shop of the Smith & Mabley Manufacturing Company, and is clearly illustrated in Fig. 1. The motor itself is but a part of the work of importance involved in the machinery equipment of the hull. Fig. 3 illustrates the flywheel cover, and the support for the oiler, spark coil, pump and other controlling equipment, making a compact and secure arrangement of these important accessories. Fig. 4 shows an aluminum intake pipe for the mixture, provided with a slip joint to

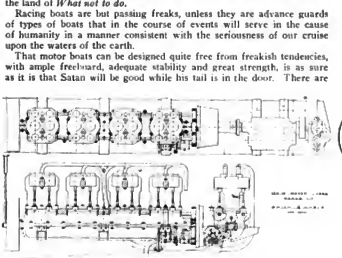


FIG. 1—THE MOTOR.

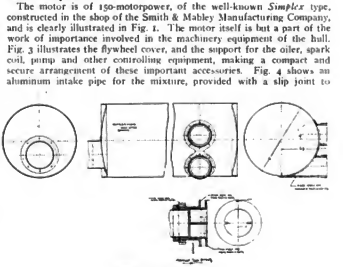


FIG. 6—THE MUFFLER.

now afloat a goodly squadron of really seaworthy, nevertheless speedy, motor boats, and, strange as it may seem, the best types in the class are strictly "American" from keel to keelson, motor and all. The Yankee eye to business has had its influence. Sport for sport's sake did not debar designers from being sane, nor is it out of order to "kill two birds with one stone," even if one bird has sporting blood.

In the races that have taken place thus far in America, the foreign competitors, with their unstable, low-freeboard boats, did not make a good showing in comparison, for the reason that they did not dare to attempt the maximum speed under American conditions. True, they drove as fast as they could, consistent with the fact that they did not desire to sink their creations; but Hudson River conditions proved their undoing every time.

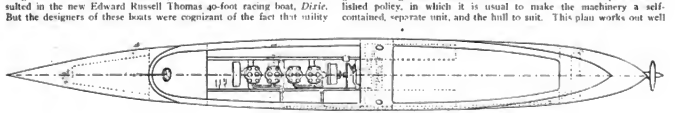
That American designers have maintained a sensible attitude has become an established fact, and that they propose to stick to practical designs is plain, in view of the recent decision of the National Association of Engine and Boat Builders, who, in promulgating racing rules, fixed the limit of freeboard and in agreeing to outlaw unseaworthy crafts.

Leaving aside the purely racing question, which, for that matter, will be conspicuous enough ere the present year vanishes into a snowbank, it is proposed here to devote space to a somewhat detailed description of a development of the 50-foot racing class into what will be known as the *Express*. Last year brought out, amongst other notable boats, the *Vingt-et-Un II* and the *Challenger*, which efforts, in due season, resulted in the new Edward Russell Thomas 40-foot racing boat, *Dixie*. But the designers of these boats were cognizant of the fact that utility compensate for unavoidable changes in length. This intake pipe is very strong and serviceable. The propeller shaft stuffing box, not illustrated, is light and strong, with ample means of take up so that leakage may be wholly avoided.

Fig 6, illustrates the muffler and the "sea fitting" in the *Express*. The cooling water passes from the jackets to the muffler and out through the sea fitting. All parts are of copper and of ample strength, but very light. In the *Express*, the gasoline is stored in two tanks located in the cockpit abaft the motor; the two tanks are set fore-and-aft, under the seats. The details of the tanks are shown in Fig. 7.

There are numerous other minor details of more than passing interest that might have been brought out by means of other illustrations, but space forbids. Nevertheless, there is one remaining feature in the *Express* that should be mentioned, and that is the reverse, in construction with the clutch, Fig. 9. In the *Express*, as these illustrations will show, Mr. G. L. Franquist decided to try out the sliding-gear principle—as used in touring cars—and, from what is already known from the performance of the boat on her trials, the scheme works like a charm. It is a noteworthy fact also that a brake is attached to the propeller shaft, by means of which quick traveling is facilitated; in fact, in this connection, it is possible to say the brake has proven to be a positive innovation.

The carbureter of the *Express* is exactly the same as that brought out on the *Challenger*, the performance of which was found to be thoroughly good. The general scheme conforms to Mr. G. L. Franquist's established policy, in which it is usual to make the machinery a self-contained, separate unit, and the hull to suit. This plan works out well



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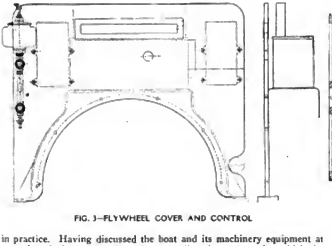


FIG. 3—FLYWHEEL COVER AND CONTROL

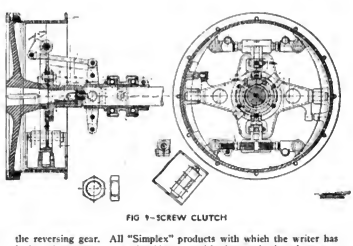


FIG 9—SCREW CLUTCH

in practice. Having discussed the boat and its machinery equipment at some length, it may not be amiss to outline the purpose for which the boat will serve.

There are a great many well-to-do men who, while they expect to attend to their business affairs, summer and winter alike, prefer to reside at a distance from town in the summer time, preferably up the Hudson, or along the Sound, and to get to business regularly, yet withal agreeably, is something of a problem in itself. Railroad trains are not comfortable in hot weather, nor can they be made so. Steam yachts are not nimble in a congested harbor, nor are they, in point of expense to maintain, pleasant to contemplate. Motor boats are free from all these objectionable features, provided they are properly designed. True, the earlier attempts were the possessors of diverse objectionable features, but time and perseverance eliminates the objectionable in motor boats as in everything else.

It is possible, then, to live at a considerable distance from town and by utilizing a craft such as the *Express* effect the journey at the rate of twenty or more knots per hour, rain or shine, day after day, and under the most agreeable circumstances. The maintenance of the craft in commission, for a season, needs scarcely be taken note of, since a crew of two men would be one more than the net requirement, while the expenses for fuel, lubricating oil and incidentals would fall far below the reasonable expectations of a gentleman of means, who, while bent upon directing his own affairs, purposes enjoying life to boot.

Individual taste would, of necessity, control the internal arrangements of a boat for this service, for, if the owner were to take more than a passive interest in motor boating, he might elect to act as his own "quarter-master" during his daily trips to and fro, with occasional excursions to places of interest; the crew under such conditions would serve to keep the boat shipshape, with nothing to do but "stand by" with the boat in actual operation, the owner at the helm.

Some owners, no doubt, would prefer to let others do the work, run the boat, and carry out instructions. Such owners would be likely to show a preference for greater privacy than the strictly racing trim would afford, so that in such cases a cabin and an after cockpit would be in order. The *Express* about favors the class of owners who prefer to operate the boat for themselves, but for the other class of owners the same designers have in process of construction motor boats of the same general characteristics, but with cabin accommodations.

That the field is quite undeveloped, as yet, may be readily understood, but that any one can predict the end is highly improbable. In any case, there are a few points, in relation to utility boats, that experience has fixed as too pertinent to be overlooked. As, for illustration, the motor must be light, durable, and simple to operate. Moreover, safety demands that the gasoline storage problem is looked after by men quite equal to the task. There was a time when a boat of any pretensions was laid down under the personal and direct supervision of hull designers, who, natural to their inclinations, pay more attention to hull lines and details of hull construction than to any other division of the work. The result, considering motor boats, scarcely afforded satisfaction to any one for the simple reason that, in motor boats, the hull is never very stiff, resulting in an unstable machinery platform. Mr. G. L. Franquist, whose efforts in the motor-boat field have been most successful, early took the ground that the motor equipment should constitute an independent unit, upon its own independent, girder-like foundation, with a flexible propeller shaft connection to the motor crank shaft, through the reversing gear. All "Simplex" products with which the writer has had to do were managed in this way, with the result that the motor equipment in every single instance was a success. In simple language the principle involved in Mr. Franquist's scheme is that of the motor car, minus the running gear. As a matter of fact, the 30-motorpower tender *Simplex*, a cup winner of very consistent performance on more than one occasion, is purely and simply a 30-motorpower touring car of the S. & M. simplex type, minus running gear, set in a 30-foot hull and connected to the propeller shaft as before described.

The side frames of the car act as the girder platform in the boat. The 150-motorpower Thomas racing boat is in exact conformity with this scheme of design, only on a larger scale. Some two years ago, when these matters of detail were up for solution, the very first attempt proved that it was not possible to pursue the old-time methods of naval architects, involving the careful design and construction of the hull and slipshop machinery installations. It was perfectly apparent, at the very first trial, that powerful motor-car motors and their accessories could not be treated as of a secondary consideration. As a matter of fact, the only satisfactory course is to build the machinery complete as a separate unit and build the hull to match. Then the motor equipment is not subjected to the stresses due to an unstable foundation, and, to be sure, a motor boat is a very unstable foundation at best.

It is not the idea here to belittle the hull work. On the contrary, it is freely and frankly conceded that motor-boat hulls are monuments of ingenuity indeed; a 40-foot racing hull weighs even less than 800 pounds, yet withal it is as tight as a bottle and of magnificent strength. But back through hundreds of years, far beyond the age of the Vikings, boats were designed and constructed with never a thought of machinery. It is very natural, then, for boat builders to consider the question of the machinery when they get time, which is generally after the hull is finished. Indeed, the writer knows of cases in which the hulls were finished ere the motors were decided upon, and yet the hull designers who were responsible talked about breaking the speed record. That the speed record needs shiver in its boots, on account of any such effort, is doubted, but that the buying public will demand motor boats of great stability, in which the machinery may be depended upon, is now an assured fact. It has been the aim to represent in the *Express* just such conditions, and, if possible, develop a serviceable type of high-speed motor boat.

It would not be proper to set forth the claim that the *Express* represents anything like the limit of motor-boat possibilities, for, as a matter of fact, the real limit is fixed by the demand.

In so far as it is feasible to do so, motor-boat builders are engaged in the development of utility boats; increasing the sizes and range of usefulness, from time to time, in step with the demand, having in view the fact that to speed ahead of the demand is to retard progress.

Larger boats than the *Express* are coming into vogue, whereas but a short while since a boat of fifty feet would have been considered a useless mastodon, as it were. Now, for the service for which the *Express* was designed, a more commodious hull would serve no good end, but by utilizing the twin-screw principle, introducing greater breadth and advancing the length to, say, one hundred feet, with a contingent increase in draft, a type of boat may at once be afforded capable of many things; yet, with all, the question of safety and economy would be well in hand *with a margin*.

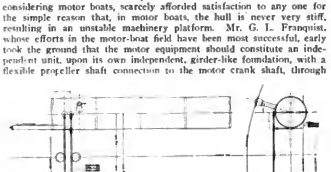


FIG. 7.—FUEL TANKS

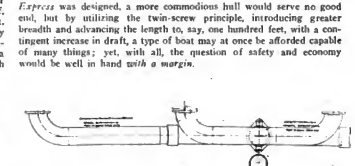


FIG. 4.—MIXTURE MANIFOLD

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Motor Mechanical Miscellany of New Practise, Patents and Perfection



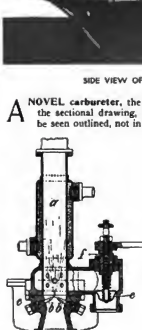
WATER CYCLE AFLOAT

A NEW water cycle which has been tried on the Danube River in Austria seems to be the most practical of all the attempts to construct a pedo-motive boat. It is the invention of Wenzel Metelka and his son, of Vienna. The boat, which was patented in January last, has an air-tight, galvanized sheet-iron hull, and is driven by the regulation propeller. The steering is operated by means of the handle-bar connected by wires to the rudder. An ordinary bicycle sprocket, cranks, pedals and crank axle, suitably connected to the propeller shaft, drives the boat. A long, light sheet-metal fin keel keeps it from turning turtle, aided by the two double-pointed smaller hulls, which are on each side of the main hull, and give it more lateral stability—on the catamaran plan. The boat weighs 75 kilograms and is able to carry a load of 400 kilograms. Its speed on its trial trip was over 16 miles an hour.



SIDE VIEW OF WATER CYCLE ASHORE

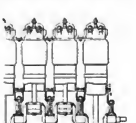
A NOVEL carbureter, the main features of which are indicated in the sectional drawing, but in which the float chamber can only be seen outlined, not in section, is that of the famous M. Brasier, of Paris. Instead of a single spray nozzle two, marked *B B*, are used, producing a better mixture, or, rather, a scattering of the gasoline spray throughout the whole incoming air stream. The mixing chamber is in the shape of a straight vertical pipe, *A*, and which is warmed by water taken from the motor. An additional air inlet is closed by the pressure of a light spring valve, which opens more or less according to the amount of the suction. It is also regulated by hand by moving the square-threaded bush, *F*. The shape of the air passage just below the nozzle is noticeable because it tends to produce the maximum velocity of the stream at the nozzle.



BRASIER'S NOVEL CARBURETER

THE automobile watering car, which has been used with success in Paris, is to have a companion motor-car sweeper. In the trials it was found that with the sweeper 15,000 square meters can be cleaned in an hour, which would take four horse-drawn sweepers the same time to accomplish. The sweeper has in combination with it a light sprinkling arrangement, which lays the dust without making mud of it, so that it can be readily taken up by the sweeper.

HEAVY, thick, blue smoke coming from the exhaust is caused by allowing too much lubricating oil to get into the cylinders. The diagram annexed shows the correct level for the oil in the crank-case, which is where it reaches the centre of the bottom bolt of the large end bearing when this is at its lowest point. It has been suggested, that to avoid having too much oil in the crank-case, to drill a hole in the side of the case to the exact level as shown in the diagram. A small cock can then be threaded in, so that, before starting up the motor, the excess oil can be drawn off. If, however, the exhaust is showing too much smoke while on the road the motor should be stopped for a moment on a level and the oil drained off. Care, however, must be taken not to leave this drain cock open when the motor is running. Needless to say to those who know, that too much oil, as shown by a smoky exhaust, fouls the sparking plugs, puts a thick, hard deposit on the piston head and combustion chambers. With magneto ignition, of course, the igniters will work even if the cylinder is flooded with oil, but the exhaust is malodorous.



A SMOKY EXHAUST PREVENTOR

A NEW construction of the cardan drive is being tested in France. The regulation cardan or propeller shaft drive with the differential in the live axle has been abandoned, and in the new method the differential is in the gear box, which is in its customary place. Two cardan shafts branch from each side of the gear box and are connected to one of the rear driving wheels through bevel pinions. The advantages claimed for the construction are that the back axle can be made stronger when the differential is not carried in it and that the gear can be hung lower.

A SIMPLE form of double ignition is that used in the Speedwell, an English car. The regular high-tension circuit with an accumulator is so arranged in combination with a two-way switch and a specially would coil as to enable the latter to serve for the usual circuit and as a coil for the high-tension magneto. The regulation contact breaker is fitted on the two-to-one gear of the motor, and the magneto is arranged beneath the bonnet so as to be driven by a short length of chain from off the main shaft. The timing rocker on the magneto is in the same plane as the contact breaker, and one rod connected to the ignition lever rod under the steering column serves to advance and retard both systems. The coil is fitted to the dashboard, and, as the illustration shows, the terminals are reduced to the simplest possible elements. The upper terminal goes to one of the points of the switch, the centre terminal is connected to the steel framework of the car, and the lower terminal is the high tension lead to the sparking plug. A single wire to the plug, however, serves for both the accumulator and magneto ignition. The detail of the remainder of the wiring is as follows: The negative of the accumulator to one part of the switch, the positive of the accumulator to the contact breaker. The switch connections are one to the negative of the accumulator, as already stated; one to the top terminal of the coil, and the third one to the magneto terminal. The simplicity of the wiring of the combined ignition systems is a notable feature of the whole arrangement. It is claimed that the car will start off just as easily on the magneto as upon the accumulator, while the change is made from one system to another by switching in the circuit when the car is moving without the slightest change in the speed of the motor.



SPEEDWELL DOUBLE IGNITION

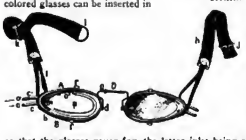
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GOETHE'S dying words, "Mehr licht," seem to be in the mind of every motorist, and to fulfil this want the cleverest oculists and opticians of the world are ever striving. The latest goggle production is that of Lumina Mirovitch, of Paris, which were worn by Théry and the three Italian competitors in the Bennett race. The glass used in them is curved, which allows a lateral view on either side. By removing two thumb-screws, colored glasses can be inserted in



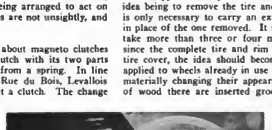
THE LUMINA MOTOR-GOGGLES

A. Adjustable ring. a. Convex lens: b. Rubber cushion: c and c¹. Ventilating tubes; D. Adjustable bridge



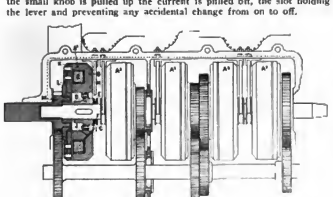
place of the white glasses. A small thumb screw is fitted so as to adjust the glasses to the breadth of the nose. An air tube is arranged so as to provide a hot air exit and a cold air inlet, so that the glasses never fog, the latter inlet being arranged to act on the lenses only and not on the eye. The goggles are not unsightly, and one is recognizable even when wearing them.

AT **every show** the idea bobs up sereoely about magneto clutches which will do away with the friction clutch with its two parts brought together by means of pressure from a spring. In line with this idea the Societe La Magnetic, of 8, Rue du Bois, Levallois Perret, Paris, has produced a motor car without a clutch. The change of speed is done by means of magnetic plates, with which each speed is supplied. The magnetic gear can be made either for cardan drive or for a chain drive. There is no change of speed lever, for the different speeds are obtained by electricity by means of magnetic plates, which replace the sliding gear. It is thus very much easier to change speed, and this operation is completed without shock or noise passing from the third speed to the reverse motion without any difficulty or danger, the reverse motion acting in this case as a brake until the car has stopped and reversed. The change-speed gear, worked upon the electro-magnetic, is arranged as follows: Two plates of magnetic steel are placed opposite each other at a short distance. One of the two is hollowed out to contain the winding necessary to pass a current of electricity round it and magnetize it. When this current, which is produced by a dynamo or accumulators, is allowed to pass through the wire, the two plates are attracted together in a manner sufficiently powerful to obtain adherence. The pinions remain always in gear, but are free to revolve round the first speed shaft, except when the two plates corresponding to each separate speed are attracted together magnetically. As the first speed pinion is attached to one of the plates, and as the other plate is attached to the first speed shaft, it will be seen that when these two plates adhere together the first speed pinion corresponding to them becomes solid to the first speed shaft and drives the second speed shaft, which, in its turn, actuates the differential gear and turns the road wheels.



DETACHABLE TIRE AND RIM

THE **idea of having** the ignition and throttle controller on top of the steering wheel so as not to have to take the hands off is gaining ground. A diversion from the original practice of the Panhard is that of having control levers fitted with a central knob, which, on being turned, drop into a slot and make the proper connections. One of the neatest of these is that used on the six-cylinder Napier. When the small knob is pulled up the current is pulled off, the slot holding the lever and preventing any accidental change from on to off.



DETAIL OF MAGNETIC CHANGE-SPEED GEAR



HERKOMER TROPHY

THE **Herkomer Trophy** was won by Mr. Edgar Ladenburg, of Munich, with his 40 m.p. Mercedes, against which were only twenty-five marks scored on the tour. The trophy is of silver, and without the plinth is about twenty inches in length and two feet high. It weighs forty kilograms, and depicts the Goddess of Victory sitting on the apex of a cloud of dust, with Mercury, personifying the commercial and industrial aspects of the motor-car movement, alongside of her. Of the seventy-nine starters on the tour, sixty-nine came through, out of which thirty-four finished without trouble of any kind; and in the exhibition which preceded the competition there were eighty-three cars.

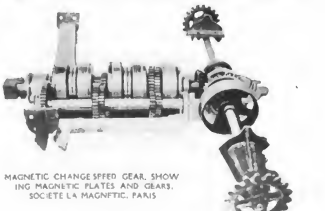
THE **illustrations show** an English idea which has for its purpose the elimination of the work required on the road when a tire happens to be punctured and the inner tube needs removing, the idea being to remove the tire and the rim bodily from the wheel so it is only necessary to carry an extra tire and rim complete and fit this in place of the one removed. It is claimed that this operation does not take more than three or four minutes, and hence it is obvious that, since the complete tire and rim occupy no more room than the usual tire cover, the idea should become a popular one. The cover can be applied to wheels already in use with very little alteration and without materially changing their appearance. In the ordinary artillery wheel of wood there are inserted grooved metal pieces in the tire circumference of the wooden felloe, and corresponding with these pieces male portions are secured to the tire of metal rim, so that when the rim is slipped on sideways the pieces engaged with the grooves and the metal are thus rigidly driven with it. To prevent lateral movement the slotted plates are swung into position and the two ends of each plate are thoroughly



THE RIM AND TIRE IN POSITION.

fastened by means of a spanner. It is apparent that with this method the strength of the wheel is not diminished; in fact, it is increased, because the metal-grooved portion acts as a strong bridge where fitted.

AN **English tire** idea is to place two inner tubes in an outer cover, one on top of the other, both tubes partially inflated. If one of the tubes punctures, the other is then inflated until it fills the space previously occupied by both tubes. Two valves are used, and the tube furthest away from the rim has its valve connected by a thick rubber tube which passes outside the second inner tube, joining it not exactly underneath, but a little to one side, so as to avoid a lump coming between the tubes. Extra resiliency is also claimed in addition.



MAGNETIC CHANGE-SPEED GEAR, SHOWING MAGNETIC PLATES AND GEARS. SOCIETE LA MAGNETIC, PARIS

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THROUGH THE PINE TREE STATE—MOTORING AND CAMPING IN MAINE

(Continued from page 30)

We reached the border at Fort Kent, Maine, and, as the St. John River was unusually low, owing to the prolonged drought, we forded it in our machines and came upon Canadian soil at the town of Clairs, Province of New Brunswick. The first thing we did was to go into a bar-room which was located temptingly near the place where we forded. It will be remembered that we had been for five days in a prohibition state and we were correspondingly "dry." The next thing we did was to ask for the customs official. A pleasant-faced individual stepped out from the group of natives who had been admiring the strange machines, and announced that he was the person whom we sought. We asked him what steps would be necessary in getting our machines into the country and he replied that he did not have any blanks and therefore there was nothing that he could do. As we had expected to be delayed considerably by custom-house formalities, we were very much pleased that we had escaped them entirely.

We continued to Edmundston and then turned due north to Notre Dame du Lac. I should have mentioned that we sent back our Maine guides at the border and here took on three intelligent French Canadians, who were procured for us by Paul Cloutier, known to all sportsmen who penetrate that wild country. While proceeding to Notre Dame du Lac, I saw several partridges on the road before me, and the temptation being great, I shot several without even leaving my seat behind the steering wheel. At Notre Dame du Lac we decided to make a detour and, accordingly, were ferried across Lake Temiscouata—two of the machines on a crude side-wheel steamboat, known as the *Storm Hero*, and my machine on a lumber raft hauled by a launch which was loaned for the purpose by M. C. Grundy, superintendent of the Temiscouata Railroad, at whose hands we received many courtesies during all the time spent in the Province of Quebec. We loaded our machines on without any difficulty, but when we reached the other side, we had to build a crude pier and gangway, as the boat could not come within some distance of the shore. When our machines were safely landed we found ourselves on the edge of a dense forest, so we followed along the beach, half in the water and half on the shore, until we came to a corduroy road used for hauling logs in winter. Here we camped for the night and the next morning traveled laboriously along this road for seven miles, when we arrived at Lake Testadi. Here we hunted and fished for several days and, in general, enjoyed in full the delights of outdoor like. Then we returned across Lake Temiscouata and once more reaching the main road resumed our course northward toward Riviere du Loup. A heavy rain set in and lasted for four days, and, while it was a blessing to the natives, it made traveling over the mountain roads even more difficult. Between Notre Dame du Lac and Riviere du Loup, after many miles of incessant climbing, at a little town called St. Honoré, we rested our machines on a high ridge of land which separates the watershed of the St. John River from that of the St. Lawrence River. Then we descended to Riviere du Loup, and as far as we can could estimate this was the only portion of our route where we made toward a lower level.

Riviere du Loup is the largest town we saw on our trip since leaving Bangor, and, even at that, it has less than 3,000 inhabitants. We could not buy a paper there printed in English, and we were absolutely ignorant of what had occurred in the outside world during the ten days which had elapsed since we left Portland. Also, we had the greatest difficulty in locating any gasoline in Riviere du Loup. Finally, we discovered one Napoleon Dion, tinsmith and member of the Parliament of the Province of Quebec, who had a barrel of the precious fluid and we here filled our tanks and were thus supplied for the balance of the trip. The gasoline obtained here, like that which we had secured further down the line at lumber mills, etc., was of an inferior grade, averaging from 70° to 73° test. The gasoline supply question had worried us more than any other phase of our preparations, but, owing to the fact that Mr. Grundy and several of my friends in the State of Maine for two weeks had been on a still hunt for places where gasoline was kept, we were able to fill our tanks every hundred miles.

Leaving Riviere du Loup, we proceeded down the sparsely settled bank of the lower St. Lawrence and, at Rimouski there we passed through a town which, no matter how small it might be, had an imposing church in some conspicuous location. Numerous shrines located along the road also attracted to the devout nature of the French Canadians. Near Bic, we left the main route and went back into the forest as far as it was possible for our machines to go, and, while there is any road which stops the passage of my car, it must indeed be a pretty crude one—to speak more accurately, it ceases to be a road. Locating our camp in this desolate region for several days, we were rewarded by killing a fine caribou, which was loaded on one of the machines and brought into camp, where we all feasted on luscious caribou steak. This incident served as the climax of our tour. Two weeks had elapsed since we left Portland, and, as our vacations had expired, we proceeded as far as Bic and there terminated the tour, returning to New York by rail.

I believe that our tour has demonstrated that it is perfectly possible for a motor car to carry all supplies and equipment necessary for man's sustenance and comfort and to leave the beaten highways and partake of the fullest pleasures of touring. However, I would advise no one to undertake a trip similar to ours unless he has a machine of good hill-climbing ability and unless he makes careful preparation and carries equipment with which to meet any emergency.

FOREIGN COMPETITIONS

PARIS, AUG. 13.—The race for the Liederke trophy over the Dinant circuit in Belgium was a wholesale triumph for the native makers. The rolling circuit, which was 102 km., 740 m., had to be covered four times, making a gross total of 255.3 miles. Touring cars only were admitted to the race, which was won by a Pipe car, a Hainaut-Pipe. The car has cylinders of 99.73 mm. bore by 120 mm. stroke, equal to a cylinder capacity of 3.75 liters. It covered the course in six hours fifty-one minutes and twelve seconds, an average speed of 41 miles per hour.

LONDON, SEPT. 11.—Napier II, the British representative, won the Harmsworth Cup, at Arachon Bay, France, covering the thirty-mile course in 1 hour, 36 minutes and 32 seconds, the French representatives not finishing.

LONDON, SEPT. 1.—The British light delivery van trials, which were scheduled to begin September 18 and extend over a period of thirty days, have been called off.

PARIS, SEPT. 10.—The Pyrenees Cup has been awarded to 40 m.p. De Dietrich, which was driven in the trials by M. Sorel. The car obtained a maximum number of points, 534. Fifty other competitors were in the test, which was a competition of touring cars in the Pyrenees district.

PARIS, SEPT. 10.—The Florio trophy over the Brescia circuit, which measures 160 km. and which was covered three times, making a total distance of 401 km., or 249.02 miles, was won by the Italia car, driven by Ruggio, in 4 hours 46 minutes and 47 2-5 seconds. Duray, on a Darracq, was second, in 4 hours, 56 minutes and 20 4-5 seconds; and Lancia, third, in 4 hours, 57 minutes and 54⅕ seconds.

MOTOR CALENDAR

OCTOBER

OCT. 1 — Hill Climb, Chateau-Thierry, France
OCT. 6-15 — Leipsig Automobile Exhibition
OCT. 14 — German Army Heavy Motor Vehicle Trials
OCT. 14 — Vanderbilt Cup Race
OCT. 15 — Hill Climb, Gaillon, France

NOVEMBER

NOV. 13 to 18 — Australian Reliability Trials
NOV. 17 to 25 — Motor Show, Olympia, London, England
NOV. 17 to 25 — Stanley Motor and Cycle Show

DECEMBER

DEC. 8 to 24 — Paris Show

JANUARY, 1906

JAN. 13-20 — Automobile Club of America, sixth annual motor car show at Sixty-ninth Regiment Armory, New York
JAN. 13 to 20 — Association of Licensed Automobile Manufacturers, motor car show at Madison Square Garden, New York

FEBRUARY, 1906

JAN. 22 to 27 — Ormond-Daytona, Fla.; annual beach speed contests
FEB. 3 to 10 — Chicago; National Motor Car Show at Coliseum
FEB. 12 to 17 — Detroit; Fifth Motor Car and Sportsman's Show
FEB 20 to MAR 8 — National Motor Boat and Sportsman's Show, New York

MARCH, 1906

MAR. 16 to 23 — Boston Show

AUTOMOBILE CLUB OF AMERICA SHOW

THE exhibition committee of the Automobile Club of America, S. M. Butler, secretary, 753 Fifth avenue, announces that the sixth annual motor car exhibition under the club's distinguished patronage and auspices will be held this year in the new armory of the Sixty-ninth Regiment, on Lexington avenue, Twenty-fifth and Twenty-sixth streets, New York City. The show will open on Saturday, January 13, and end on Saturday, January 20. In its preliminary announcement the committee states that it is to be an open exhibition of motor cars, parts and accessories of both home and foreign manufacture, and invites makers from all parts of the world, without restriction or qualification of membership in any organization, to exhibit their goods.

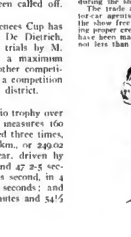
One of the original features of the first show held in this country will be revived, and that is the gathering from all over the world of cars used for military purposes, touring cars and all other vehicles which demonstrate the varied possibilities of usefulness for the motor car.

The net profits of the show will be divided into three equal parts, one-third to go to the Sixty-ninth Regiment, one-third to be divided among the manufacturers exhibiting pro rata according to the amount of rental paid by each, and the remaining one-third to be placed in a special exhibition fund by the Automobile Club of America for future exhibitions.

The whole of the main floor of the armory, the rooms adjoining in the administration building on the Lexington avenue side and in the annex on the Twenty-fifth street side, and the basement will be devoted to the exhibition of complete motor cars. The main gallery floor, including the galleries, corridors and rooms adjoining and the gymnasium on the third floor will be devoted to the display of parts and accessories.

With the idea of promoting harmony of design and yet avoiding monotony, the decorations, signs and lights of all the exhibition spaces will be furnished by an official decorator to be paid for by each individual exhibitor, and these decorations will consist of denim floor covering with suitable mouldings, iron railings, signs with rows of electric lights across the top, the background coverings and draperies being fireproofed; no gasoline being allowed in the building at any time during the show.

The trade and industry as represented by the motor-car agents and manufacturers will be admitted to the show free from 9 a.m. to 3 p.m. daily by presenting proper credentials, and special conditions and rates have been made for trade tickets to be sold in lots of not less than one hundred.



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EVERY ONE EQUIPPED WITH Diamond WRAPPED TREAD TIRES



A String of "Moxie" Cars in Boston

ONE of the largest users of automobiles in business is the Moxie Nerve Food Co. President Thompson of this company wrote us recently: "We are using Diamond Wrapped Tread Tires exclusively, and are well pleased with results."

The Reason is Simple

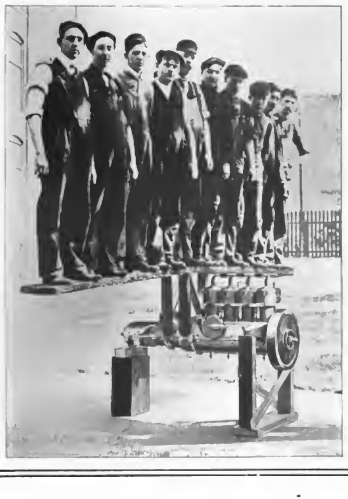
Arthur A. Mitten, of Buffalo, told it in a letter he wrote us after a tour from Chicago:

"Diamond Tires Have Settled the Bugaboo of Tire Troubles"

If you are not already familiar with the merits of our wrapped tread construction, let us put you in communication with some one in your own locality—no matter where—who uses these tires—some one whom you personally know.

We shall be glad to do this. You will be glad you investigated.

THE DIAMOND RUBBER COMPANY, - - - Akron, Ohio



Stevens-Duryea

TWENTY HORSE POWER, FOUR CYLINDER

TOURING CAR

Price, $2,500.00

THE DEMONSTRATION OF STRENGTH

herewith illustrated, showing 10 men supported by the STEVENS-DURYEA Three-Point Construction (combined weight of the men being 1685 pounds) conclusively proves that the driving shafts cannot be thrown out of alignment by conditions met on the road. This impressive test furthermore makes good our statements that the Stevens-Duryea MOTOR delivers all of its power to the rear wheels, as numerous notable hill-climbing victories emphasize.

The "three-point suspension" and general construction of the Stevens-Duryea were patented April 4, 1905. (No. 786,349.)

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CHICOPEE FALLS, MASS., U. S. A.

MEMBERS ASSOCIATION LICENSED AUTOMOBILE MANUFACTURERS

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Too Much of Many Good Things

By James P. Holland.

SATIETY is the word. That's what's the trouble with motoring to-day! It may be too much of a good thing or too much of a bad thing, but it certainly is too much of something. Nor is it difficult to give that something a name if one only stops to think. For example, there has been too much racing. There are too many organizations. There are, and have been, too many promoters hungry to get up meetings and festivals on the flimsiest of pretexts. There have been altogether too many patrons willing to donate trophies, or cups, or plates, or some other device, always open to competition, but never won. There have been too many so-called contests or competitions. There have been too many shows involving too much expense alike on the makers and buyers of motor cars. There has been too much legislation, resulting in too many uniformed loafers with too much time on their hands for their own or the public's good. There are too many publications claiming to be devoted to the interests of motorists, but none the less eager to get a share of the principal as well as interest of the motor-car trade.

* * * * * * * * * * * * *

But there is no likelihood of too many cars at least for a long time to come.

* * * * * * * * * * * * *

Too Much Racing.—Since public sentiment and the judgment of experts have decreed the suppression of motor-car racing on tracks, it may appear a little paradoxical to say that there never has been any motor-car racing—that is to say, racing worthy of the name. Yet the ablest writers on motoring affairs in France have long ago put themselves on record as holding this belief. Eliminating the dare-devilry of contesting drivers and the uncertainty of the moment of inevitable disaster, the speed qualities of rival motor cars become a matter of simple mathematics. It is precisely this process of elimination going on for years which is responsible for the present unpopularity of so-called racing. To look back over the names of "eliminated" dare-devils, the list shows such men as Fournier, Charron, De Knyff, Jarrott, Edge, Vanderbilt, Harkness, Winton, Mooers, and a hundred others, including last, but not least, Thery, who have retired with whole skins from the sport. The roster of victims of inevitable disaster is even a longer one, including such able drivers as Zobrowski, Marcel Renault, Webb Jay, Earl Kiser, and Barney Oldfield. Some of these have lost their lives; others have lost their nerve; all are out of the exciting game. With their disappearance, so-called racing has died a natural death.

* * * * * * * * * * * * *

It took nearly a hundred years to develop the mile-a-minute Pullman train. It took ten years to achieve the same result in the motor car. For this the racing car and the dare-devil driver must be given credit.

* * * * * * * * * * * * *

Too Many Organizations.—Since the invention of printing I doubt if any single letter of the alphabet has had to bear such a burden as the capital A has done during the past ten years. I except, of course, the vertical vowel which all of us, even a modest scribbler like myself, must press into service more or less frequently. The reason for this abnormal demand for capital A's may be seen at a glance from the following string of initials commonly used to designate the various organizations connected with motoring: A. C. A.; A. A. A.; A. A. C. N. Y.; N. A. A. M.; A. L. A. M.; A. A. M. C. M.; A. M. L.; and one or two others whose exact titles escape me. Where so many rival claimants for the first letter of the alphabet exist side by side, it must go without saying that their rival claims to jurisdiction must come into conflict in a number of points. Thus the Automobile Club of America, while yielding to the American Automobile Association supremacy in matters pertaining to sport, still clings to its prerogative of naming a team for the James Gordon Bennett race, while the New York Motor Club is an out and out opposition shop to the Automobile Club of America, yet has to bow to the American Automobile Association in the matter of sanctions for race meets. Similarly the National Association of Automobile Manufacturers as the parent trade organization finds its supremacy challenged by the Association of Licensed Automobile Manufacturers in the control of the national shows, while the Automobile Club of America and the Association of American Motor Car Manufacturers range themselves in opposition to the two first named by holding a show of their own. Between two of these organizations, rivalry has gone to the limit of litigation, the end of which no man can foresee. Clearly there is a satiety of organizations in the field to-day and something should be done if only to save the first letter of the alphabet from working overtime.

* * * * * * * * * * * * *

Wanted: a genius of organization who can organize the organizations and give me a rest. Address Capital A.

* * * * * * * * * * * * *

Too Many "Promotions."—One Saturday afternoon early in the summer I met a man looking for two or three racing cars. He wanted them, he said, to fill out the program for a race meet to be held somewhere in New Jersey the following day, Sunday. He was the "promoter" of this meet and when I suggested that it would be advisable to get an official sanction as a preliminary to obtaining either cars or drivers, he seemed grieved for the suggestion and showed his gratitude by thrusting a bundle of free admission tickets into my hands for distribution. The sequel, as told in Monday morning's papers, showed that he had been unsuccessful in his quest for cars and that the fourteen hundred spectators, dead-head or otherwise, had shown their disapprobation by smashing the box-office and raising general Hades for the unfortunate "promoter." Whether he got away with any of the gate receipts or not, I do not know. Anyway, it is immaterial. The fellow did a good service to this sport. He was simply too previous in springing the "shoe string" game before the public was ready for it. Had the program of "promotions" so loudly heralded at the beginning of the season been carried into effect as originally announced, the fourteen hundred spectators would have taken their medicine and said nothing about it. But though the vicinity of the metropolis has been fortunate in escaping a surfeit of promoters, the rest of the country has not. Bare-faced fake promotions for ulterior purposes, made possible by the keenness of manufacturers to secure meretricious advertising, have become altogether too frequent. That I may not be misunderstood, let me state explicitly that such performances as speed trials at Ormond or the hill climb at the White Mountains or the Vanderbilt race are not referred to. So long as the mania for excessive speed may continue there will retain their popularity. The rest of the promotions could well be dispensed with.

* * * * * * * * * * * * *

Too much promotion and not enough sport will probably explain the public indifference to mile-a-minute motor-car races.

* * * * * * * * * * * * *

Trophies Galore.—Two years ago friends of the late F. A. La Roche who chanced to drop into his den on Thirty-eighth street, New York City, were sure to be treated with details of an interesting dispute over the possession of a few trophies gained by the Darracq car on the western circuit. The outcome, if I remember rightly, was that La Roche held the cups, while the disappointed driver returned to France minus the material evidences of his prowess as a racing man. Since that time poor La Roche has died and the trophies, whoever has them, have become valuable only as old plate. Other makers of cars have in the meantime found themselves the possessors of useless, if expensive, loving cups, silver and gilt, vases of bronze or other metal, but all alike an encumbrance which have cost their owners more than their weight in coin to obtain. Notwithstanding this, the number of trophies open for perpetual competition, or, in other words, trophies with strings tied to them, has enormously increased. There are trophies for everything from the mile sprint to the three hundred mile race. Yet singularly enough, simultaneously with this abnormal multiplication of cups and plates, comes the news that the king trophy of them all, the blue ribbon of the motor car, the Bennett cup, is going a-begging for an owner. The Automobile Club of France, the present holder of the prize, finds itself satiated *ad nauseam*. It cries aloud for somebody, anybody, to come and take the cup off its hands. And should the Vanderbilt cup follow in the wake of the Bennett trophy, then will the position of the French club be pitiable indeed. Of course the action of the club cannot rob the donors of these prizes, Messrs Bennett and Vanderbilt, of the credit due them as disinterested patrons of the sport.

(Continued on page 60)

EDITOR'S NOTE.—The retirement of J. P. Holland from the American motor car publication field removes a remarkable and virile literary personality from American publication motordom. The opinions expressed in the following article by the "immitable Jim" do not wholly concur with Mooers's, but with this modest disclaimer, we gladly give him this opportunity of saying his last word to American motordom before returning to "the other side of the pond."

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A Few Words to the Automobile Agent

If your agency arrangements during the past year have been satisfactory, do not make any change.

We don't believe in changing agencies unless there is a good reason. Naturally, we desire to get in touch with the best men in the business, as we want the strongest sales organization we can get for the WAYNE cars.

There are two ways for a manufacturer to obtain his agents. One is to have a high-priced sales manager—an entertaining gentleman of fine address—who can go out and make contracts irrespective of the actual merits of the car. The other method is the "show me" method, where the manufacturer gets down to "brass tacks" and makes his agency arrangements based upon the actual merits of his car and by giving the agent a fair and square deal all around. The Wayne cars have won a foremost place among American automobiles by actual merit, and the Wayne Automobile Company has made rapid strides to the front.

Last year we spent upwards of $50,000.00 in judiciously advertising our cars. This year we are going to do even more advertising, and the agent who takes the Wayne car now is going to get the benefit from this publicity and is going to get the hearty coöperation of the factory as well.

We have perfected arrangements for early and prompt delivery of our 1906 models because we want to be in a position to carry out the "show me" policy and to live up to our agency agreements.

We have the cars, gentlemen, we have the facilities for manufacturing and for making deliveries, and we are going to do our full share in thoroughly advertising the Wayne cars. Now we want to get our 1906 agency arrangements closed and then we are all in shape to make money. Will you write us about the Wayne representation in your territory to-day?

WAYNE AUTOMOBILE CO.
Dept. M. DETROIT, MICH.

Cleveland
THE CAR OF SIMPLICITY



Model D, 98 in. Wheel Base

A Perfect Score

was the record of a CLEVELAND CAR in an endurance contest, held under the auspices of the Los Angeles Examiner. The run from Los Angeles to Santa Barbara—110 miles—was through a very mountainous section of country. The CLEVELAND—regular stock Car—carried four passengers and was driven by the owner, Mr. Nat Myrick, who received a "first-class certificate" from the committee.

¶ There were forty-two cars entered in the contest, and the CLEVELAND was one of FOUR cars that had perfect scores.

¶ The performance of the CLEVELAND on this occasion was no greater than any CLEVELAND CAR is capable of.

¶ Immediate delivery. Twenty horse power.

¶ Demonstrations gladly given by appointment.

BRING AN EXPERT WITH YOU

¶ Our catalog contains full descriptive and illustrative details—Sent on request.

Cleveland Motor Car Co.
380 Erie Street, Cleveland, Ohio

General Eastern Distributing Agent:
E. B. GALLAHER, 141 West 55th St., New York

DISTRIBUTORS:
Boston—Butler Motor Car Co., 998 Boylston Street
Chicago—The Bennett Bird Co., 1404-1406 Michigan Ave.
Milwaukee—F. W. Arbogast Motor Co.
Southern California—Worthington Garage, Los Angeles

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WELCH

1906

LIMOUSINE CAR

FOR FALL AND WINTER USE

Practically Immediate Deliveries

Ask for 1906 Catalog, just out, describing Welch Patent Detachable Pullman Limousine Cars. Seven passenger car to suit all seasons—cape top in summer, half Limousine to full sail Pullman Limousine in winter. 1 to 50 miles on direct drive. So simple a child can operate.



WELCH-Motor-Car Co.
Detroit and Pontiac Mich.



Underwood Visible Writing



It makes no difference what typewriter you now use, or have used, the machine you will eventually buy is the

UNDERWOOD

UNDERWOOD TYPEWRITER COMPANY
241 Broadway - - - New York City

TOO MUCH OF MANY GOOD THINGS

(*Continued from page 58*)

But should the distaste for trophies become epidemic, what will become of the truck loads of cups and trophies with lesser names attached? Will they fall into innocuous desuetude or into the hands of the junk dealer? Better cull in the junk dealer at once and have done with it!

* * * * * * * *

What doth it profit a maker to gain a carload of trophies if his salesrooms remain crowded with motor cars?

* * * * * * * *

TOO Many Shows.—"There would be good money in this business if it were not for the show nuisance," said the head of one of the largest firms of manufacturers to me after the close of the Boston show last winter. He had done the whole wearisome round of the show circuit, New York, Philadelphia, Chicago, Detroit, Cleveland, Buffalo, Washington, and Boston, and was almost worn out with his experience. Business had been good at every stopping place, and in his case, at least, it was no exaggeration to say that the entire product for this current year had been bespoken. Actual bona fide orders were already in excess of his intended output. Still he was not satisfied. "It's an unnatural way of doing business, this tramping around the country, circus fashion," he said, "and certainly does not add to the dignity of the trade nor enhance the popularity of the motor car as a permanent institution. If anything is calculated to prolong the impression that the motor car is a fad or a craze that will sooner or later die out, it is this absurd fashion of hawking show cars from town to town for one-week stands while everybody in the business makes a showman of himself for two or three months. Honestly, I feel, when the show season is over and I get back to legitimate business, as though I had been doing a stunt as a traveling faker without even a hawker's license. And when I come to figure up the enormous cost of this itinerant business, I would willingly pay half the cost to anybody who could devise a scheme to suppress it entirely, or at least confine it to one national show and let it go at that." Sooner or later it will have to come, a cessation of this idiotic show nuisance. Yet here we are increasing instead of cutting off the evil—two and possibly three shows next year in New York, two in Boston, and I don't know how many smaller cities claiming for admission to the show circuit! Let 'em all come in, until the nuisance becomes unbearable. Then some wideawake manufacturer will save the money squandered on shows and give his customers the benefit. That will kill the evil.

* * * * * * * *

A thirty-million-dollar industry ought to be above county-fair methods if it has faith in its own stability.

* * * * * * * *

TOO Many Motoring Papers.—Last but not least, there is a surfeit of motoring publications. In this I speak from experience as editor and publisher of a weekly paper, which, during its brief career was at least as readable and certainly possessed as good, if not better, circulation than the average of its survivors. Its financial condition even to the hour of its suspension was healthier than that of others of equal account—but enough of post mortems. It was *de trop*, and recognizing this fact I ceased its publication. Long before I arrived at this conclusion and acted upon it, the argument of "too many papers" had been dinned in my ears from a hundred sources. The reading public who subscribed so liberally for "Motoring & Boating" said so. The men prominent in motoring circles, outside the trade, repeated the same thing. And the members of the trade who smart under the load of financial obligations in the shape of multitudinous advertising contracts are never weary of repeating it.

(*Continued on page 92*)

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The Pleasure of Automobiling

in the winter is spoiled if one's face and ears are unprotected. The SCOTT Neck, Ear and Chest Muffler

MAKES ZERO WEATHER PLEASANT

¶ They are warm and dressy, and can be folded and put in the coat pocket when not in use.

¶ They are made in various weaves, and plain and combination colors.

¶ Our illustrated booklet, showing the Mufflers in the various colors in which they are made, together with prices, will be sent on request.

¶ Drop us a card to-day.

The Scott Muffler Co. 15 Gallia St. Portsmouth, O.



The absolute best in Motor Lamps

this SOLAR PARABOLENS HEADLIGHT

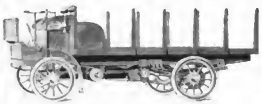
throws most powerful beam of any lamp made, yet burns cool. Simple, safe and sure, no better lamp can be built. The most your dealer will say about the next best is that it is "just as good as a SOLAR"—but why not buy the *standard* and dodge the second best?

We stand back of every SOLAR lamp with a guarantee to *you*—a warranty that leaves no room for risk on the buyer's part. You can't buy better lamps—whether oil or acetylene.

Write for booklet—or ask your supply man

Badger Brass Co.
Kenosha, Wis.
New York Office, 11 Warren St.

KNOX



NEW MODEL STAKE TRUCK

Developed along the sound lines of construction that have built up for us the largest Gasoline Commercial Car Business in the country.

POWERFUL RELIABLE ECONOMICAL

CARRYING CAPACITY, 60,000 LBS.

Cylinders Air Cooled Speed 12 Per Hour

Chassis is adapted to bodies of various styles

Every firm using trucks of large capacity should investigate this new model. It is one of the finest products of our many years' experience in building cars for "All the Year Round" service. Write for particulars as to Waterless Knox D 4 Stake Truck.

Agents in All Principal Cities

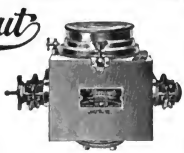
KNOX AUTOMOBILE CO., Springfield, Mass.
Largest and oldest manufacturers of Gasoline Commercial Cars

Members of Association of Licensed Automobile Manufacturers

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PATENT SAFETY GAS PRODUCER



Makes gas only as needed and is instantly lighted and extinguished. The gas is pure and dry, and the flame steady, penetrating and intensely white. Saves its price many times over by its economical use of carbide, and is easily cleaned and recharged. No danger of explosion, no after-generation: no odor, trouble or waste.



This patent safety gas producer is the best in every way for providing the gas, just as

The Neverout
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MIRROR LENS
SEARCHLIGHT PROJECTOR

is the best for projecting the light.
Write for free illustrated catalogue.

ROSE MANUFACTURING CO.,
Largest Searchlight Factory in the World.
914 ARCH STREET, - - PHILADELPHIA

COOLERS FENDERS



HOODS TANKS

BRISCOE MFG. CO.
are the
Oldest and Largest Makers of
Automobile Radiators

Over 30,000 of our radiators are now cooling Automobile engines.

Our standard honey comb radiators are of true cellular construction, allowing cross circulation, which accounts for their high cooling efficiency per pound of weight of cooler.

The hit of the year 1905 in radiator design has been our flat tube construction with gang fins. We make special designs for every class of car from the light runabout to the heaviest truck or omnibus.

The finish on Briscoe fenders is unexcelled. 1906 styles on metal dashes, hoods and runabout boxes are prepared and we are daily booking contracts for next season's business.

Write to our nearest office for estimates.

BRISCOE MFG. CO.
DETROIT, MICH., and NEWARK, N. J.

Do's and Don'ts
FROM A MOTORIST'S EXPERIENCE BOOK

Where Not to Use a Taped Joint.—Rubber friction tape is a most useful adjunct to the repair kit, but one must know how to use it. I once saw an attempted non-stop run spoiled because a spare spark coil had been fitted to the car—a single-cylinder machine—and the man who did the job had spliced the secondary cable from the spare coil to the regular plug cable, and had left the taped splice lying on one of the cross members of the frame. New dry cells were used, and they gave so much current that no one noticed that, besides the spark that appeared at the plug, another and fatter spark was jumping through the tape to the frame. The car stopped suddenly when a hundred and ten miles had been covered, and the battery tester showed that the cells were nearly spent. If the spliced joint had been tied several inches clear of the frame another chapter might have been added to motor-car history.

Tape Useful to Protect Rubber.—One place where tape may very usefully be employed is on rubber hose or rubber insulation exposed to oil, especially hot oil. For example, the high-pressure hose of a White steamer, or hose connecting the power water pump to the generator, is constantly subjected to the drip of hot oil escaping from the crankcase. It is of very heavy rubber and the best of fabric, as it must be to withstand a pressure of 350 lbs. to the square inch, and it requires so much force to stretch it over the pipe fittings at each end that the only roadside remedy for a burst is to carry a spare hose complete with fittings attached. This hose will rot rather quickly if unprotected, but if covered with half a dozen layers of friction tape—two half-pound rolls will do—its life may be trebled. The tape should be evenly and tightly wound and should cover the ends completely. I think that probably a bandage of plain cotton strips heavily shellaced would serve the same purpose even better, but have not tried it.

The Cost of Overloading.—If you have a small touring car—the ten motorpower, two-speed, good-roads sort—don't pile ten men into it for a moonlight spin out to "The Farm" or "The Wayside Thirst Parlor" and back and expect it to reach a venerable old age. If your tires are rim-cut, if your clutch fails to hold, if your low-speed gear is loose and noisy and your springs sag, turn over the leaves of your memory a bit and think whether you have overloaded your car. And if your friend did that to his machine last summer, and now offers it for sale "because he wants a bigger car," look out for him. He may have "had no trouble," but he is selling his car just when the troubles are about to begin.

A Cardan Joint Accident.—The cardan (universal) joints of my propeller shaft are each composed of a pair of yoke forgings of the usual form, connected by a "Greek cross," each forging being connected to the cross by a pair of pivot pins screwed into the forging and having their ends turned down below the thread size for a bearing in the cross. The pins have "hex" heads and were supposed to be locked, but were not. The other day one pin in the rear cardan unscrewed and dropped out, whereupon, of course, the forging wrenched itself free from the cross, breaking the opposite pin; and the propeller shaft, from the square slip joint at its front end to the rear cardan, dropped into the road. Investigation showed that the strain of wrenching free had spread the yoke forging and cracked one of its prongs, but not so badly, it seemed, that it might not hold together long enough to get the car home if a substitute could be supplied for the pins. Luckily, the cross was drilled clear through, either for alignment of the pivot pins or so that its centre could be packed with grease. A fellow club member, happening along just then, gave me a lift to the nearest town, where a ½-in. by 5-in. machine bolt and extra lock nut were procured. Of course, the bolt wabbled all around in the yoke threads where the pins had been screwed, but that could not be helped, especially as the yoke had sprung, so the bolt was put in with plenty of grease and the nuts screwed tight enough to support the yoke against further spreading. I nursed the car all the way home in the dark—a ticklish job with several unfamiliar hills and a somewhat "fierce" clutch—and on arrival found that that precious yoke had held to perfection, though the strain of driving had slightly bent the soft iron bolt. A new yoke was promptly ordered, but I am now inclined to think that the old one might have been retained by heating it, restoring it to shape, brazing the crack, and then boring out the threads, bushing, and substituting a straight steel bolt for the two pivot pins.

Clutch Hints.—If your car has a leather-faced flywheel eluteh, don't leave it in the rain with the clutch out. The water will do the clutch no good, and if the cone in internal and no drainage is provided it may be hard to get rid of the accumulated moisture. To keep the eluteh leather in condition a little castor or neatsfoot oil, evenly distributed with a feather or the like, is the best dressing.

The Care of Ball Bearings.—Few parts of a car are so dependent on proper treatment and so sensitive to neglect as the ordinary cup and cone adjusting ball bearing. Although better forms of ball bearings have been produced, notably the non-adjustable two point, still even the adjustable cup and cone bearing will give excellent service if intelligently cared for. Some ball bearings, it is true, especially in the older American motor cars, are practically hopeless by original design,

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"Everything for the Autoist but the Auto"

The New Book is in press. Please send for it.



We are about to issue a new illustrated catalogue de luxe of 200 pages devoted to the new imported and domestic models of automobile apparel for men and women for Fall and Winter service. Presented are garments of fur, leather, cloth and rubber, together with a comprehensive series of requisites. To you we would be pleased to mail a copy without charge directly it leaves the press.

Saks & Company Broadway, 33d to 34th Street New York

WHICH ROAD WILL YOU TAKE



THE LONG WAY AROUND THE SHORT WAY OVER

Equip your car with a **Brennan Motor** and you won't have to take the long way around. We invite you to investigate our motors. It won't cost you anything. Hundreds of others have and they're all taking "the short way over," too. Read what one of the many satisfied users of **Brennan Motors** says:

THE BRENNAN MOTOR CO., Minneapolis, Minn., Aug. 12, 1905.
Syracuse, N. Y.

Gentlemen:—I suppose you are as curious to know how your motors are running as well as the parties who own and use them. I have a 12 H.P. motor in my car which carries four passengers, and we have some pretty good hills around here, and I have run my motor up those hills on the high gear a ton we thought ever switching to the slow gear with a 20 and 30 H.P. car (weighs 2,000 lbs.) and have passed them on the hills. I have also run it up a hill that had on it 18 inches of snow, doing such good work. I will be pleased to give any of your patrons the full information of this experience which I have had with your motor, which I consider the cheapest on the market, and the best for the money.

Very truly yours,
Name given on application.

BRENNAN MOTOR CO.
103 Grape St., Syracuse, N. Y.



SWINEHART TIRES

CHICAGO, ILL., Aug. 2, 1905.

THE SWINEHART CLINCHER TIRE & RUBBER CO.
Chicago, Ill.

DEAR SIRS:

I have used your Solid Tires now for about eighteen months and have run between ten and fifteen thousand miles on them. They have not given me any trouble whatever from the time they were put on until now.

For boulevard driving I think they are just as good in every way as pneumatics. On cobble-stone and rough roads I think there is a little more vibration than with pneumatic tires. **They have not increased my repair bill any,** nor **have they hurt my machine in any way.**

I am perfectly satisfied with them, and in fact would not take a set of pneumatic tires as a gift, to use on my machine.

I expect the set of tires that I now have on my machine, which have already run eighteen months, will last two or two and one-half years longer. Yours respectfully,

DR. F. R. SHERWIND,
100 State Street.

THE SWINEHART CLINCHER TIRE & RUBBER CO.
Akron, Ohio

New York Office 1773 Broadway — **Chicago Office** 1206 Michigan Avenue

Waterman's Ideal Fountain Pen

This Fountain Pen is the standard writing instrument of the world, everywhere known and recommended by experts to be the best. It excels in simplicity of construction, in the quality of the materials used, and in perfection of workmanship. The most important feature is the improved Spoon Feed, which conducts the ink from the reservoir to the gold pen with absolute uniformity and certainty, and without danger of blotting. Holders are made in a great variety of styles and sizes, and prices are given for pens and holders complete, with an ink-filler and a box to hold them.



In price of the Continuous Silver Clip and attaching it to any size cap in the foregoing list, extra.

We make an order, Solid 14 kt. Gold Clip, Rolled Gold Plain, Engine Turned, Mounted, Ring Silver, 50c.

Most stores carry complete assortments, but where you cannot be served satisfactorily call or write our nearest depot. Be sure the pen you purchase is marked "Waterman's Ideal."

L. E. Waterman Co., 173 Broadway, New York

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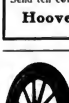
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CLOTHING JACKS HAMPERS
STORM COVERS

Everything in Sundries

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Artillery Wheels
1905-DESIGNS NOW READY

Hubs equipped with Roller, Ball or Friction Bearings. Smarting Devices fitted to all Hubs. Steel Rims.

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The most necessary automobile tool on the market. Adjustable to any size tire. Finely nickel plated. Price, $2.00, postpaid.



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Sample, including leather case, prepaid on receipt of $3.00	3 Volts 30 Amperes	Send for Catalog.

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You may need it. Our case contains all the necessary remedies and bandages, etc., together with full instructions.

Send a dollar for it.

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Second-Hand Automobiles

Dealers, write to us for our Special Bargain Sheet. We have the largest stock of second-hand Automobiles in the country.

Times Square Automobile Co.
104 W. 48th St., New York City
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being either too small for their work or out of line by construction or through springing of the shaft, axle, or the like.

The bearings must be kept clean. If in the wheels they have a fairly efficient dust protector in the heavy grease with which they are packed, which, as it works out, stops the ingress of dust. If the bearings are on the gear shafts of the transmission it may be necessary to use felt washers or strainers to prevent the ingress of gritty oil. This pernicious mixture is ruinous to plain bearings, and almost equally bad for ball bearings, as the oil cuts the grease and the grit cuts the balls and cones.

The bearings must be occasionally opened for inspection. This means taking the balls out, wiping the balls and races clean, and inspecting both carefully in a good light for the smallest sign of crack or abrasion. The life of the fixed race (cup or cone) may be prolonged by giving it an occasional quarter turn, so as to transfer the load to a fresh arc of its surface. It is a good plan to do this periodically on general principles, and it must in any case be done before the surface begins to break or chip or to wear noticeably hollow.

Visual inspection is insufficient to tell the condition of the balls. They must be calipered by a micrometer caliper, each ball over at least three different diameters, thus testing both the sphericity of the balls and their equality of size. Balls up to ½ inch in diameter, if they carry any considerable load, should not vary in diameter by more than one-thousandth of an inch between the smallest and the largest. If one ball in a set is found defective it will rarely be possible to replace it alone—if the others are materially worn—as the new ball will probably be too large, and the result will be that it will every few minutes be compelled to take the entire load. In purchasing balls, never take the salesman's word for it that they are the same size, but caliper them and sort them to the nearest thousandth of an inch. It does not matter if the balls are a thousandth or two under or over size, provided all are alike.

The bearings must be periodically adjusted. If the races are in perfect condition and there is no sensible spring between the shaft and bearings the latter can be adjusted closer than if the races or alignment are defective. A bearing adjusted too tight will crush the largest ball and flat it, thus making matters worse. In the extreme hardness and inflexibility of the balls and races. If the adjustment is too loose the load will be localized on a couple of balls at the loaded side of the bearing, and the result will be the same, although it will not come about quite as soon. When the bearing is correctly adjusted it should be possible to feel the very slightest amount of shake in it at all angular positions of the shaft. If in the wheel bearings that are being adjusted the wheel should be jacked up so that its freedom of turning can be observed.

A Grounded Battery.—Last spring I pulled out all the old wire in my car and rewired it throughout with the very best cable obtainable. All the wires were so supported and insulated as to insure them against breakage from strain or vibration. The switch and connections were examined and the timer found in good order. Consequently when one morning my car ran 20 feet and stopped, and, on being cranked again, ran 10 feet and stopped, I was somewhat perplexed. It was soon found that the coil trembled were not working; that they refused to work with any adjustment, although a very faint spark was obtained on disconnecting a wire. An ammeter test of the battery cells individually showed each to give four or five amperes, which I already knew to be sufficient. All connections were tight, and when the two sets of five cells each were connected in series a strong spark was obtained. The mystery was solved when I remembered that the battery box was bolted to its brackets with round-headed carriage bolts passing through the bottom of the box. I had put the cells in with no other insulation from the bolts than was afforded by the pasteboard shells surrounding them, and one of these had chafed through, grounding part of the battery on the bolts. A sheet of fibre clipped under the cells made everything right again.

THE
"Coat of Mail"
TIRE PROTECTOR

Is an envelope of RUBBER and FABRIC (same as a tire itself), that completely covers the tire. It fits like a glove. The tread is covered with an armor of small steel plates, held in place by steel rivets.

It is Absolutely Unpuncturable—a sure nonskid—saves ALL wear and tear from the tire—saves at least ⅓ the tire expense—saves all repairs—cannot pull off.

Makes old tires practically new. Makes all tires unpuncturable and everlasting. Drop us a postal and we will explain and prove these points.

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The Marion Motor Car
Simply Built
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Air COOLED. 16 horse-power DEVELOPED.
Beautiful in design and finish. EASY RIDING. Speedy. DURABLE and DEPENDABLE. We build it.
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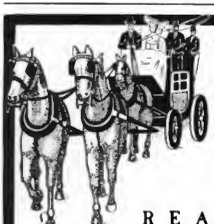
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"Mountain and Lake Resorts," a handsomely illustrated book of 128 pages, will give complete information about hotels and boarding places, their rates and location, together with more than 175 pictures. The book also contains a fascinating love story, "A Paper Proposal." Sent on receipt of 10 cents in stamps. Address T. W. LEE, General Passenger Agent, Lackawanna Railroad, New York City.

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Elegant in Finish
Luxurious in Appointments
Built by Skilled Workmen from the Best Materials obtainable

The Simplest Gasolene Car in the World
both as to construction and control and the easiest to operate and maintain.

"Marks a New Era in Automobile Construction"

40-45 Horse Power $5,000

CORWIN MANUFACTURING COMPANY
Peabody, Mass., U. S. A.

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SAFETY and the OLDSMOBILE

"Is it safe? Can my wife and boys run the car without danger of its giving out at the critical moment?"

A prospective buyer put these questions to us. He weighed our answers carefully and bought an Oldsmobile. Now all four members of his family are instructed in its operation and it is in constant use.

Here is what we told him:

The driving of an automobile may be dangerous for two reasons: It may be so complicated that its proper operation is difficult, or it may not have strong enough parts and brakes to hold in case of emergency.

The Oldsmobile is safe at all times because it has

Two brakes	Analyzed material
Large parts	Severe construction tests
Strong springs	Unbreakable steering connections
Heavy spindles and wheels	Simple operation

We could devote more space than we have here to each one of these features. A call on our nearest agent will give you an opportunity to see our cars for yourself, and a demonstration is the strongest argument we can put before you. We will be pleased to answer any questions if you care to write us direct.

OLDS MOTOR WORKS
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Lansing, Mich. - - U. S. A.
Member A. L. A. M.

"I have had lots of experience with spark plugs," writes a Peoria dealer, "and have never found the equal of the

Soot Proof

It has no equal. It is the one plug with perfect insulation.

"The spark always jumps"

Heat-proof, oil-proof and wear-proof for six months of ten hours a day. That's the "Soot-Proof" guarantee.

All sizes, $2 by mail or at dealers. Write for booklet. Don't get caught by imitations.

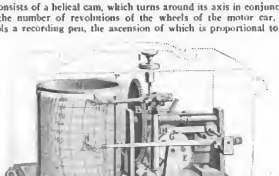
C. A. Mezger 203 W. 80th Street New York

A RECORDING ODOMETER AND SPEEDOMETER

THIS instrument built for motor cars is based on the same principles as those built for recording the total number of revolutions of other machines. It differs only in its dimensions, which are smaller, making it possible to place it upon the motor car in a convenient place.

Besides recording the distance traveled, it records the number and the length of the stops, when a given route must be made, as is the case with street cars, stages, delivery wagons, etc. The instrument is not put within reach of the chauffeur, but is generally placed under the motor car, in the most convenient place for making the necessary connections with the shaft of the motor, and is closed by a padlock to prevent interference.

It consists of a helical cam, which turns around its axis in conjunction with the number of revolutions of the wheels of the motor car, and controls a recording pen, the ascension of which is proportional to the



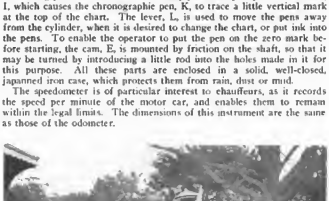
JULES RICHARD RECORDING ODOMETER AND SPEEDOMETER. OUTSIDE DIMENSIONS—LENGTH, 6½ INCHES. WIDTH, 4 INCHES. HEIGHT, 5¼ INCHES. WEIGHT, 1¼.

distance traveled by the car. The cam, E, receives its rotary motion by means of an endless screw and gear wheels, A, B, C, D, so calculated that it makes a complete revolution for a given number of revolutions of the pulley, P. This cam controls the pen, H, by means of a pin, G, forming part of a lever, mounted on the same axis as the pen arm.

The pen traces the curve on the chart, carried by the recording cylinder, M, which contains a clock movement, causing it to make a complete revolution in 23 hours. If desired, cylinders of 6½, 26 or any number of hours, may be substituted. The diameters of the pulley, P, on the instrument, and the one on the driving shaft of the motor, must be in such a ratio to one another that a complete ascension of the pen, or in other words a complete revolution of the cam, corresponds to 10 miles. It is therefore necessary to know, when determining the diameters of these pulleys, either the diameters of the wheels of the motor car or the number of revolutions of the driving shaft of the motor corresponding to a mile.

A second chronographic pen, K, serves to record the passage between interesting parts of the route. It is simply necessary to press the button, I, which causes the chronographic pen, K, to trace a little vertical mark at the top of the chart. The lever, L, is used to move the pens away from the cylinder, when it is desired to change the chart, or put ink into the pens. To enable the operator to put the pen on the zero mark before starting, the cam, E, is mounted by friction on the shaft, so that it may be turned by introducing a little rod into the holes made in it for this purpose. All these parts are enclosed in a solid, well-closed, japanned iron case, which protects them from rain, dust or mud.

The speedometer is of particular interest to chauffeurs, as it records the speed per minute of the motor car, and enables them to remain within the legal limits. The dimensions of this instrument are the same as those of the odometer.



CLYDE FITCH, THE FAMOUS PLAYWRIGHT, AND VIOLA ALLEN, WHO IS TO APPEAR IN ONE OF HIS PLAYS THIS SEASON, IN THE FORMER'S LOCOMOBILE

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WHY PREMIER Cars Appeal To All Classes

To the Professional Man—Because of its simplicity
To the Business Man—Because of its readiness to go at all times
To the Repair Man—Because of its perfect accessibility in working parts
To All Men—Because of its low cost of fuel and maintenance

We have much data from drivers on this latter point; for instance, one writes us: "The total cost of my running this season—5,000 recorded miles—is only a trifle over one cent per mile for the car—or 3 to 4 cent per mile per passenger—total for repairs, fuel, etc., excepting tires."

These are points to remember when purchasing a car

"The Quality Car"



THE AIR COOLED SEASON NEVER ENDS

Side Entrance, $1,500 Our new (1906) Doctor's Special, $1,425
Runabout, $1,250 Light Truck, $1,400

PREMIER MOTOR MFG. CO.
INDIANAPOLIS, IND.

Members American Motor Car Manufacturers' Association



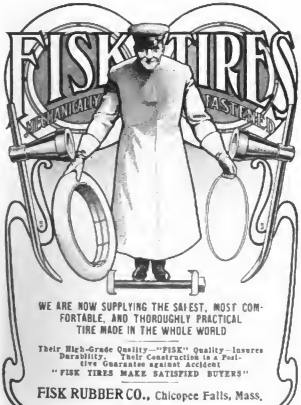


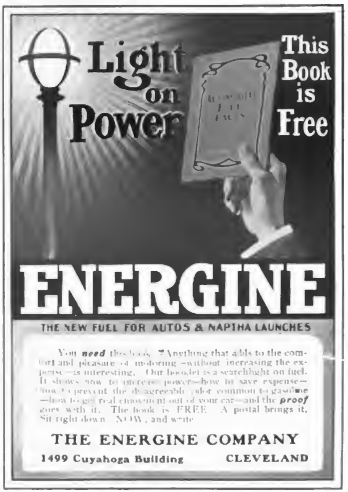
PROTECTION

The Speedometer Protection Tag *protects the automobilist against unwarranted arrest*—but it will not prevent speeding. The over-ambitious mounted officer will not arrest on guess work—if this tag is displayed on your car in some conspicuous place. Users of the Jones Speedometer are not in evidence in court—but there is always a possibility of arrest. *Protect yourself;* equip your car with the only accurate and practical speed indicating device on the market. The tag goes with the instrument.



JONES SPEEDOMETER
Manufactured by Jos. W. Jones
135 West 32d St. New York





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The tire question sifted down to the

GOODRICH

INTEGRAL CONSTRUCTION



"I have used all kinds of tires during the past five years but have never heard of such a record as this—7,000 miles' travel over mountain roads and not even a puncture to the rear tires."

W. W. PRICE, Colorado Springs, Col.

THE BAILEY WON'T SLIP TIRE

Regular Goodrich construction, but provided with the Bailey Won't Slip Tread. Prevents slipping, slewing or skidding.

THE J B. F. GOODRICH CO. (Dept. 18 P)

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NEW YORK, 1668 Rande Street and 1915 Broadway. BUFFALO, 26 Main Street. SAN FRANCISCO, 310 Mission Street. CHICAGO, 141 Lake Street. DENVER, 1611 California Avenue. DETROIT, 80 E. Congress Street. CLEVELAND, 240 Superior Street. PHILADELPHIA, 909 Arch Street. DI NYER, 6444 North Street. LONDON, E. C. — Snow Hill.

A Long Jump or Two Short Steps



Find an Elmore agent or user and you'll find a two-cycle enthusiast. The fame of the two-cycle idea has spread this season from ocean to ocean. Its principle—a continuous application of power—is irresistible and indisputable, and that principle is put into practice with absolutely perfect success in

THE TWO-CYCLE ELMORE

Picture to yourself two men—one trying to cover the ground in long, hard jumps, the other forging ahead in quick, short steps. The test is the three-mile—hardly hear against the two-mile with its even, steady gait. We have a book called "A Long Jump or Two Short Steps," which explains this in A, B, C style.

Better still, we have a record of sh-herin in every test worthy of the name. Better still, we have the every day testimony of Hundreds of users to which you can easily refer.

The Elmore two-cy in engine is no longer the "coming" engine—it is here. You'd better join the army of enthusiastic converts. Ask your agent or write to us.



REPRESENTATIVES

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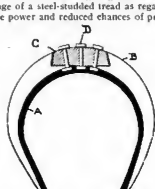
THE ELMORE MANUFACTURING CO., • Amanda Street, Clyde, Ohio

MICHELIN BENNETT RACE TIRES

RECOGNIZING that the tire problem is the most difficult one in a road race, M. M. Michelin brought out a new tire especially for the Bennett race.

The tread of the tire is of leather, and is steel-studded like an ordinary non-skid band, but the leather, instead of being superimposed, is let into, and vulcanized solid with, the actual rubber of the tire, and the inner ends of the steel rivets are embedded in the fabric lining.

The relative depth of the leather is shown in the accompanying sectional drawing, which also makes clear the manner in which it is dove-tailed into the rubber. The idea has been to construct a tire as a complete unit, which shall approximate very closely to the plain pneumatic in its obstacle-absorbing properties, while at the same time giving the obvious advantage of a steel-studded tread as regards adhesive power and reduced chances of puncture.



CROSS-SECTION OF THE NEW MICHELIN TIRE, USED IN THE BENNETT RACE. A. FABRIC. B. RUBBER COVER. C. LEATHER TREAD. D. STEEL RIVETS

Were it possible to successfully mount the studs directly on the rubber itself, this would probably have been done; unfortunately this is not possible, and it is therefore necessary to resort to leather as the most flexible material which possesses the requisite tenacity to withstand the tearing strain.

Completely encasing the rubber of the tire with an external leather covering has hitherto been the general practice, but the bad radiating qualities of this material have to be taken into account when the conditions are such as to make the tires very hot. Naturally enough, the difficulties of successfully constructing such a tire as that we have described are extremely great, and it may be taken for granted that M. M. Michelin has not advocated its use without the assurance of its good qualities based on extended tests. If these tires prove entirely successful on racing cars, we understand that they are to be put on the market for touring cars in the near future.

Of the new tire M. Michelin says:

"The ever-increasing weight and speed of motor cars had rendered the use of non-skids an absolute necessity.

"The Michelin non-skid tire, which has now been placed on the market, aims at preserving the advantages of leather as a medium for the attachment of the metal studs, without at the same time having the disadvantages which are pointed out above. The leather band is only on that part of the tire which touches the ground and the rest of the tire is identical with a smooth-treaded one, thus allowing the heat to be well radiated. Besides this, the non-skid retains all the flexibility of an ordinary tire. The studs around the tread naturally afford great protection to the tire against punctures, since half of the exposed surface is imperforable and the other half—being of leather—it very difficult to penetrate."



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AUTOMOBILE SUPPLIES

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Honest Value
Reasonable Prices
Prompt and Courteous Treatment and Delivery

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CHICAGO, U.S.A.

THINK



FAWKES TIRES

Do you do your own thinking or do you allow some one else to do it for you? If you do your own you will buy

FAWKES TIRES

for they are the best. We shall do better for you than any of our competitors.

Remember! *No pumping. No puncturing.*

You get there and back without delays or mishaps. Just what you want. Let us prove it.

Write to day for our free booklet and full particulars.

Milwaukee Rubber Works Co., Cudahy, Wisconsin
Dept. W. (Suburb of Milwaukee)

SANS' Vulcanizer

Don't send your tires to the repair man

PUNCTURED SPLIT or TORN No matter how bad they are; DO IT YOURSELF. It takes 10 minutes—costs a few cents and *NO BILL TO PAY*

If you send it to the shop they will use anyhow **Vulcanizer**

SANS'

SOLE U. S. AGENT

International Motor Car Supply Co.

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Acme Motor Cars

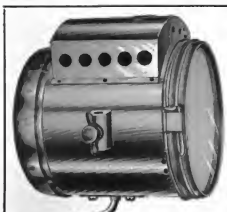
—Sure Starting
—Sure Stopping
—Sure Going
—Sure Coming

Reliable in any emergency—in any weather—on any road. Instantly responsive and efficient.

Demonstration in ten cities

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Columbia Search Lights

A. with 5-in. mirror lens.
B. with 6-in. mirror lens.
C. with 7-in. mirror lens.
D. with 8-in. mirror lens.

All are equipped with adjustable burners.

In our three portable generators, the water feed is controlled by gas pressure and you get the least possible amount of moisture on the carbide at any given time.

Write for Catalogs.

Hine-Watt Mfg. Co. 56-66 Wabash Ave, **Chicago, Ill.**



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Steel Belt

For Oil-Pump or Fan

It works—works all the time, and makes your pump work. Does away with delays; won't stretch; won't break; won't slip. Far better than leather.

"Lasts as long as the car"

Price $3 Must be satisfactory, or you get your money back. Order to-day and give make, year and model of car, and length of present leather belt. Write for circular A.

The unbroken label with Powco trade-mark on every box insures Powco steel.

Philadelphia Ornamental Wire Company
628 Filbert Street Philadelphia

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THE MARMON

"A Mechanical Masterpiece"



Front Wheel Raised Over a Post

In a Class by Itself

True in more respects than one—but one will illustrate.

Ever sit in the tonneau of an automobile going at a good rate of speed over a rough road? Didn't you spend half your time in the air, bouncing eight or ten inches off the seat, not counting the lurches to one side or the other?

Isn't any machine "In a Class by Itself," if it takes you over any road, at any speed, with the easy, gentle sway of a Pullman?

In the Marmon, you don't know that most of the bumps or ruts exist.

And the same exclusive patented feature that makes this luxury of motion possible in the Marmon—**and in no other car**—is as great a blessing to the **entire** mechanism as it is to the passengers.

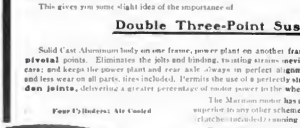
All other cars, were it not for springs, would be less flexible than a **log-wagon**. The log-wagon has two advantages—its front axle is movable, providing some elasticity, and it has **no costly driving mechanism to protect and keep in alignment.** Obviously, no other car, with its rigid axles and its body and entire mechanism suspended on the same springs, could surmount an obstacle as the Marmon does in the picture above.

Even in the instance where an obstruction lies straight across the path, where both wheels would naturally strike it together, the Marmon driver has only to shift his course and take it at an angle in order to overcome it through the elasticity of the Marmon construction.

This gives you some slight idea of the importance of

Double Three-Point Suspension

Solid Cast Aluminum body on one frame, power plant on another frame, **each frame** suspended on three **pivotal** points. Eliminates the jolts and binding, twisting strains—**nerve-racking** in the rigid suspension of all other cars; and keeps the power plant and rear axle always in perfect alignment. Means fewer parts, simpler parts and less wear on all parts, tires included. Permits the use of a perfectly straight rigid shaft drive, **without Cardon joints**, delivering a greater percentage of motor power to the wheels than is done in any other car.



Four Cylinders; Air Cooled

The Marmon motor has a simple force lubrication system that is superior to any other scheme of oiling. Spur planetary transmission (clutches included) running in oil.

There are just a few of our **reasons** for saying that the Marmon is "In a Class by Itself." Booklet No. 9 describes it fully. Yours for the asking.

Nordyke & Marmon Co.

Established 1851

Indianapolis Indiana

AMERICAN INDESTRUCTIBLE SPARK PLUG



OVER 200,000 IN USE.

Have you ever used it? If not it will pay you to do so. Stands the racket where all others fail. Has double insulated mica core. No short circuits. Lasts indefinitely. We also manufacture a full line of up-to-date jump spark ignition apparatus, coils, plugs, dynamos, switches, ammeters, etc. Write for Catalogue "C". P. O. Box, 503.

AMERICAN COIL CO., West Somerville, Mass.
New York Agents, Auto Supply Co., 1062 Broadway



NEW MOTORS FOR OLD

If you suffer from loss of engine power or other troubles, let us sell you a new motor, and make allowance for your old one. We have hundreds of customers buying both new and second hand and carry a fine assortment from 4 to 20 H. P. for automobile and marine purposes. Our general catalogue of parts, bodies, axles, wheels, tires and sundries for every purpose is well for you to have and is FREE. Ask for discount sheet as we make prices that are RIGHT.

NEUSTADT AUTO AND SUPPLY CO.
836-38-40 South 18th Street ST. LOUIS, MO.



Springfield Tops
Patented April, 1905
Aluminum Bodies

SPRINGFIELD METAL BODY CO.
376 Birnie Ave., Springfield, Mass.

THE EFFECT OF THE MOTOR CAR ON HEALTH

(Continued from page 38)

he must be removed to another hospital at some distance. Even the ordinary motor car is continually called upon to go upon some mission of mercy. Every day one reads that some motorist passing along, by chance, volunteers to take the victim of accident to some distant hospital. I have one before me, from a recent paper, where a baby with two broken legs was rushed a distance of fifteen miles, late at night, and its life saved by the speed which nothing but a motor car could have developed.

If we turn from these mechanical and surgical benefits to health, to the hygienic influences of the motor, the sphere widens, just in proportion as the bulk of the population does from that of the hospital, for, of course, the health of the great bulk of the population must be considered as outside the sphere of the mere accidental. Life and health are the resultant of fixed conditions. Every day surroundings determine, in the end, our physical well being or otherwise.

Now there is no gainsaying the fact that the tendency of fixed conditions has been in the last fifty years, and more especially in the last twenty, towards physical deterioration. The movement has been accelerating, with self-evident force, towards concentration of numbers. Concentration necessitates the surrender of air, even to the extent, as has recently happened in many cities during the heated period, of the authorities being obliged to allow the congested populace to take their bedding into the public parks, and sleep out on mother earth, lest the physical prostration of the thousands overwhelm the capacity of the hospitals.

The consequential results are harassed and exhausted parents; offspring born with that handicap, and reared under circumstances gradually deteriorating both their physical and moral conditions. All of us know that air, light, and space are the trinity upon which the health of the human body depends. Deprived of these, it may exist, just as the sightless fish exist in subterranean rivers.

Just in the nick of time to prevent the consummation of those evils to health, physical, and mental, there has come the revelation of new means of applying the forces of steam, electricity, and gas, in redistributing the population back to old conditions, so far as space, sunshine, gardens, and surroundings are concerned. The day of the various motor cars has arrived, adding to the old-time country conditions all the accessories and auxiliaries, which have become a second nature to the erstwhile city dwellers. Man will hereafter dwell in the country, but he will never again be isolated. He will enjoy all its advantages, without its old-time stagnation. The same force which moves the car will move the wheels of commerce, and reduce the question of locomotion to a common factor which will place the suburbanite and the city dweller in the same category, so far as the two great streams of civic and social life are concerned. The country will not hereafter mean a deprivation of opportunity.

The upbringing of the millions of the future will be round and about the fountain head of health, fresh air, and sweetness. We shall know the outlines and contours of the hills, and the succession of the budding of the trees, and what each signifies; we shall be able to tell, from the tiny tines of green on the arable lands, what have been planted there; we will be able to recognize the cries of the migrant birds flying southward in the fall, and the dolcet notes of the first warblers coming northward in the spring. We shall watch the procession of the wild flowers. We shall come to know every clump of trees which rise on the outline of the sky or nestle in the valleys. We shall know just where to watch for a vista of silvery birches or a glade of olive green oaks, and sniff the fragrance of the crops, from the new mown hay to the upturned earth of the ploughman of the fall.

With all this, too, the motor car will have banished one of the most fruitful sources of

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WOULD YOU LIKE IT?

If so, write for it, step into it, take a ride. If satisfactory, remit price.



THE ROBE OF COMFORT
The Davis Air Tight Bag Lap Robe

The ***Davis*** Robe is ***cold*** proof, ***wind*** proof, ***rain*** proof, and proof positive against the dangers of "catching cold" from a cold or wet ride. The *interior* of The Davis Robe is *always* warm and dry. They are made of the finest grade of black, pure rubber drill, *guaranteed* not to crack, or if preferred they are made of Black or Blue Mackintosh Cloth, and all are lined with *finest heavy* imported dark green plush.

Stays where you put it

It cannot slip or jar out of place as do other robes. It can be adjusted or removed quicker than any other robe and admits of perfect freedom in operating the car. The wearing portion under the feet is covered with calfskin.

This robe bifurcated is called

"The Davis Arctic Over Pants"

Is convenient for the "man at the wheel"—walk about in it. **Price—Robe, $10; Baby Bear *Fur Front*, $20; Over Pants, $10.** (Send length of inside seam and waist measure for over-pants).

TERMS

When cash accompanies order we prepay express charges, agreeing to refund money if goods are not as represented. Or, we send C. O. D. subject to examination before accepting. Or, we send on *approval* to responsible people—we pay the express charges if satisfactory.

Our Illustrated Booklet tells more about it.

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126 South State Street, Chicago

The Heinze Motor Car Coil



is the latest type of coil which we have added to our large line of coils which we have manufactured during the last eight years for X-Ray and Wireless Telegraph, and is the result of a vast amount of experience and past experimentation.

This coil is so designed as to give the greatest electrical efficiency and to produce a very hot spark of great frequency and will not burn out, even though double the number of batteries are used to operate this coil that are commonly used with other makes of coil.

The ir lation used throughout the construction of this coil is of the most efficient kind, and of the same kind which we are using in the construction of coils producing from twelve to fifty inch length of sparks, or a million of volts.

A sample trial will convince the most skeptical that we have undoubtedly attained the highest efficiency and can guarantee these coils to fulfill all the claims we make for them.

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Largest Manufacturers of X Ray and Wireless Telegraphy Coils

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The trouble lies not in the lamp but in the gas generators—they frequently go wrong when most needed. The

PREST-O-LITE Gas Tank

never fails. Supplies two lamps fifty hours with perfectly even run of pure, cool gas. Never wears out, gets out of order or leaks. Instant supply of gas for any number of lamps. Never freezes. Never clogs tips.

Chicago, July 26, 1905.

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Gentlemen:—In reply to your esteemed favor of the 20th inst., beg to say that I have found the Pre-O-Lite Gas Tank admirable in every respect, and would not want to get along without it.

With best respects, I am, Very truly yours,
JOHN FARSON,
Farson, Leach & Co.

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Righter than Ever

From their very beginning REO cars were right. What they did in the past year proves it. The 1906 models will do *the same and more of it*.

We have not altered any essential feature that made REO cars beat their nearest competitor a minute to the mile in the great "Climb to the Clouds" up Mt. Washington, win three cups in the famous Paddock Hill contest over cars of double their rating and price, and earn First-Class Certificates of Honor in the Glidden Tour for an endurance and economy record never equalled.

New Things

Only a few slight changes: An improved oiling device, which feeds directly and automatically without a valve. Positive measured charge which proportions itself absolutely to the engine speed. An improved perfectly timed, short-contact commutator—which insures sparking and economizes current. More graceful bodies than last year—lower in the back, larger, wider and with more tapering hood. These points add a perfecting up-to-the-instant touch to cars already demonstrated in principle and construction right as right can be.

Built for What Happens

Ready October 1st

The REO 1906 Touring Car—16 h. p., 1550 pounds, 90 inch wheel base, 5 passengers, side door detachable tonneau. Speed 35 miles per hour. **$1250.**

REO 1906 Runabout—8 h. p., 800 pounds, 2 passengers, 25 miles per hour. **$650.**

Write for the REO Book that tells why



REO Motor Car Co.
Lansing, Michigan.

R. E. Olds, President
R. M. Owen, Sales Manager

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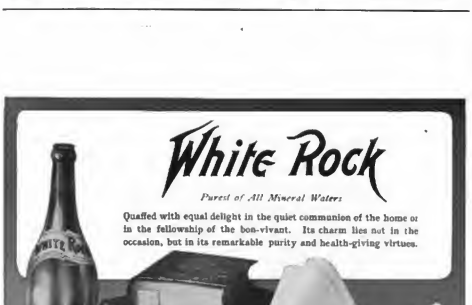


PRICES

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Napier Motor Company of America

BOSTON, MASS.



sickness, which has been left as a punishment to us for reducing so noble a creature as the horse to a beast of burden, to be used and abused for our profit or pride, and then cast off. Nature will not be flouted, man cannot play fast and loose with her laws, and escape from his heartlessness or ignorance. Nature calls for the penalty and exacts it. What we sow in disease and neglect we reap again, and the horse is no exception.

All horses, barring the few which are accidentally killed, die from the effects of internal disease, and thousands of them are worked for years when so affected. They descend from one estate to another: from the private carriage to the cab, from the cab to the peddler's cart, from the peddler's cart to the junkman, until they are nothing less than elongated barrels of internal putridity, just capable of holding together. They have not the gift of speech to complain of their ailments, and to the last of their lives, their excrementa, filled with the bacteria of diseases, is deposited on the public highways.

Many of the diseases of the horse, such as typhoid fever, which ends in a complete ulceration of the bowels, and glanders, which is a virulent decomposition of the mucous membrane of the throat, are communicable to man. That is well established. The *bacillus coli communis*, the cause of typhoid fever, is the most frequently found microbe in road sweepings, but scarcely less numerous are those of animal tuberculosis and diseases of the throat and eyes.

The casual thinker may ask "if that be so, how is it that hostlers and horsemen who daily tend them in the stable, are apparently immune? The answer is simple. It is because in a stable the bacteria-charged excrementa is almost always moist, and therefore innocuous. It is only when dried by exposure to the sun and wind, and ground into dust on the roads and streets, that they are set free to float in the air, whence they effect a lodgment in man by being inhaled. These facts are well established, even the sputem of the most acute consumptives is harmless, so long as it is moist, It is only in the form of dry dust that the doctor dreads it, for it is then fatal.

Many a subtle problem which used to puzzle the medical profession is to where possibly could a patient have caught the deadly germ of some fatal disorder, whilst surrounded by conditions seemingly the most perfectly hygienic, and with no clue discoverable as to its source, is now answered by the disease-germed streets and roads. The horse is both the cause and the consequence, he contributes the deadly germs and hammers the residual product into minute atoms. Out of a thousand motor cars, a hundred, carelessly handled, may emit a noxious vapor, but ten millions of them could never contribute a disease germ to the atmosphere.

LOG BOOK OF A MOTOR CAR

THE Ætna Life Insurance Company, of Hartford, Conn., has just issued a "Log Book of a Motor Car," edited and compiled by C. H. Gillette, former secretary of the American Automobile Association. This little volume contains principally a motoring trip log, which consists of, approximately, one hundred pages in blank form for the compilation of the log. The motorist, as he makes his tours, may jot down in the book the memoranda of distances, times, incidents, etc., etc., of each trip. In addition to this, there are blanks in which the motorist may record his expense account of maintenance and operation, and there are further spaces for memoranda, addresses of hotels, garages, etc.—all of which are of immense value. To quote from the introduction, "This 'Log Book of a Motor Car' is to give the motorist something that will not only be helpful and convenient while being used, but will also be instructive and the means of calling up many pleasant memories in the future. An old diary is always refreshing reading, and this book will be equally so in years to come."

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The Lea "Speedistimeter"

Tells speed, distance and time of day

Connected to the wheel by flexible shaft which runs through floor of car and is entirely out of sight

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"Homans' Automobile Educator" is clear and concise in its treatment of the subject, and is comprehensible to the most inexperienced man. At the same time it is so thorough and detailed that the expert will learn much from its pages.

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Price, 40c to 30 inch, 50c, 75c, 90 inch.

Everything in rubber sundries, tool rolls, covers for cars, etc. For sale at leading hose and dealers.

Look for the name GILBERT, don't accept imitations.

Catalog sent on request

GILBERT MFG. CO.
New Haven, Conn

THROUGH THE POCANTICO HILLS

(Continued from page 34)

had reference probably to the product of the district."

By this time you had reached the road which ran up into the Pocantico Hills, turning at right angles to the river. Bedford Road, you recall, was the name, the same road which a long while ago you had bumped slowly over, with frequent stops, in a rickety old wagon behind a team of horses. Now you merrily, even swiftly, climbed the grades, watching the hill lower before you, and then—you held your breath, didn't you, as suddenly the rolling hills burst upon you? I remember you said you had never before seen anything fully as beautiful and that it was different from the Pocantico country you had seen before. Different? But what about you? Hadn't you changed your point of view?

"Over there," Jones interrupted, then, pointing northward, "is Sleepy Hollow, and here is Sleepy Hollow Road which crosses this road. This country Irving has made immortal in his 'Legend of Sleepy Hollow,' the romance of Ichabod Crane and Katrina Van Tassel, and of the frightful apparition of the headless horseman. In a little old cemetery nearby lies Washington Irving."

Soon you were on top of Kikeout Hill, and straight before you rolled Buttermilk Hill, and the lower mounds. Ahead you bowled the car over the tops of the lesser hills, up hill and down dale, still on Bedford Road, past Buttermilk Hill to Pleasantville. Here you turned southward, through Sherman Park, to Unionville, and went along the Saw Mill River Road. You hadn't yet reached a surfeit of Pocantico Hills and back into them you went, along Tarrytown Avenue, which follows Saw Mill River, to Eastview. Then you climbed Kikeout Hill again from another direction, and further marveled upon the wonderful beauty of this Rockefeller country.

And so you rambled a-motor, and time and the miles flew, you (in fact all of us) marveling, Jones pedantically historical, and I—well, call me Boswellian. Finally, late in the afternoon, you turned again along Bedford Road from Kikeout Hill, through Pleasantville, into the Saw Mill River Road, and southward through Unionville till we reached the highway that leads to White Plains, just at the southerly point of Valhalla Lake.

Will you ever forget how you descanted for days and days afterwards on the beauty of the Pocantico Hills? How that trip started you on scores and scores of trips until now you know them all, but never tire of them? It's all in the point of view.

THE HANDWRITING ON THE WALL

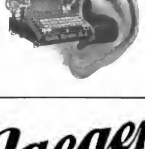
FOR fifty years Peter Lorillard Ronalds has been the typical representative of American road driving for pleasure. Nine four-in-hand coaches has he had made, used, and worn out in those years. Forty-eight years ago he made a coaching tour from his country home, Castle Ronalds, at Newtown, Conn., through all the eastern coast resorts. Thirty years ago it was one of the sights of Broadway, New York, to see him handle his four-in-hand. All Europe has seen him since, on every road from Genoa to Antwerp, and in England he has been a familiar whip. This summer he has coached his last, duplicating the American seacoast resort journey which he made first in 1857. Now he is satisfied that the coach's place is in the museum, and his "number nine" will be kept there as a pleasant relic, to be handed down to posterity as a family heirloom; for Mr. Ronalds has determined to continue his road touring by motor car. Not an ordinary motor car, but one which has "all the comforts of home," a veritable yacht on wheels. "Next summer I shall go from my home to Maine and back," he blithely says, "at a pace which will enable me to see the country and enjoy life as I go." Worldly-wise old philosopher, who knows whereof he speaks! His is indeed the handwriting on the wall!

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We simply mention this to show the basis we have for claiming to know all about making oil automobile Lamps. The result of this long experience in making them is seen in our oil Lamps of to-day which are the HANDSOMEST, STRONGEST, BEST BURNING and MOST CONVENIENT LAMPS on the market.

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Charles E. Miller,
New York, N. Y.

Dear Sir:-

Replying to your letter of the first inquiring what success we have had with the Brampton chains we have secured from you, would say that the writer, personally, can hardly say too much in favor of the Brampton chain. Before I put this chain on my machine I used the ##### and neither of these chains would last more than a few weeks on my car. I have run the Brampton now for quite a long while and it shows absolutely no signs of wearing.

The chains we have secured for other parties in this town have given universal satisfaction.

Very truly yours,
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Washing the body of the machine, keeping the polished surface free from lubricator, road dust and gutter muck is just as essential to the life of an Automobile, as is the attention given the running gear.

Mobo, the new cleanser for Automobiles, will easily and quickly remove grease, dirt and grime and all traces of a hard run, without dulling or scratching the highly polished surface.

MOBO

is unlike common soap, as it positively contains no free alkali. Being a preservative as well as a cleanser, it prevents varnish or paint from peeling or cracking, and adds a fine gloss to the surface.



Mobo may be used with profit on leather goods, harness or woolen fabrics. Cannot harm the most sensitive skin, as it is a purely vegetable oil preparation and absolutely contains no free alkali. Put up in 2-lb. and 8-lb. cans; also in tubs, half barrels and barrels.

If your supply man does not keep "MOBO" send us his name and we will see that you are supplied.

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Toledo construction throughout, weighs but 1,400 lbs. Its absolutely noiseless, flexible cylinders actually develops considerably more than 20 H.P., and what is more important this power is transmitted *to the wheels*. It is the first Automobile containing *all* the accepted features of the world's best practice in motor car construction offered at anything like the price—$2,000.

We have a little booklet which fully illustrates and describes Type X, which we will be glad to mail on request. Also catalogue containing this and specifications of Type VII, 30 H.P., Front entrance, $3,000. 45 H.P. Side Entrance, $5,000.

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A. L. Dyke Auto Supply Co.
Olive & Walton Sts., St. Louis, Mo.

THE JUMP SPARK

(Continued from page 68)

lower pressure a spark plug may be fairly dirty, or the wire leading to it may be a little moist, or its insulation somewhat questionable, and yet not enough electricity will leak to be serious.

It is not only for this reason, however, that it is desirable to have the spark points very close together. The spark from points ½" apart is not as hot as the spark from points 1-32" apart. It has to be of such high pressure that its quantity is low. It appears thin and blue even at a casual glance.

The spark from points 1-32" apart comes from a much lower pressure current, which enables its quantity to be correspondingly higher, and this makes the spark very hot and reddish in color. A hot spark obviously has a better kindling value than a long, relatively cooler, one.

Hence, short spark gaps, the shorter the better, are desirable, and for reasons quite evident.

Thoroughness of Contact in Timer Box or Commutator—We have seen that the electric current from the batteries is a feeble one. So feeble, in fact, that we have to have good contacts everywhere and over wire in the coil which it feeds. We have also seen that the timer, or commutator, as it is sometimes termed, controls this current, providing a path for it during the interval that the spark is wanted in the engine and breaking the path when it is not wanted. If by any chance now, this timer or commutator should not provide a low resistance path, it is evident that all the effort spent elsewhere in the battery circuit to make it easy to traverse is thrown away. The already feeble battery current is made still feebler, and feeble magnetization of the iron core results, which means feebler vibration of the vibrator, feeble induced current in the secondary coil, feeble jump spark and feeble or missed explosions in the engine.

The contact in the timer box must, therefore, be thorough, and thoroughness not only implies clean surfaces, but *completeness* of contact during the *entire* time the timer intends there shall be contact.

Sometimes a timer makes a good contact part of the way across the contacting surface but a poor contact on the remainder of the surface. If one will consider what a brief time this poor contact device has of it at best, trying to provide an easy, low-resistance path for a feeble battery current, and break it off, and all in a few thousandths of a second of time, we realize how important it is that it have every chance there is.

Should the contact be poor the first part of its surface, the total time it gives the battery current to operate the coil is not only reduced, but the moment of commencing the sparking is delayed. Both are bad. At high engine speeds, when we most need a healthy, strong spark, we get not only a weakened one, but one late in arriving.

Vibrator Adjustment—This is one of the most terrible and fatal of motor car maladies. Being the most conspicuous and easily accessible of the adjustments on a motor car, it comes in for frequent, fearful, and wonderful treatment.

Almost all vibrators have two adjustments. One is a conspicuous little adjustable screw held in a bridge directly over the vibrator blade. A little platinum point on the end of this screw makes contact with a little platinum spot on the vibrator blade itself. This is the contact which is rapidly interrupted and remade by the magnetic action of the iron core referred to earlier in this article.

The other adjustment is usually an inconspicuous screw which sometimes passes down through the vibrator blade, and at a casual glance may be taken for one of the screws which secure the vibrator in its place. There are different arrangements in the various makes of coils for accomplishing these two adjustments, but the results aimed at are all the same. In order to take advantage of the magnetic pull of the iron core every time the battery current magnetizes it, the little piece of iron on the end of the vibrator blade should be placed as near to it as possible. The little

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screw in the bridge over the vibrator is adjustable solely to secure this proximity. It should be screwed down enough to bring the iron about 1-16" from the end of the iron core, and there is no reason why it should be adjusted again, since it is not likely that the core will move out overnight.

Now, however, in order that the battery current may be interrupted by the pulling down of the vibrator when the current has arisen to its full value, and not before, the tension or spring of the vibrator blade has to be adjustable. The inconspicuous little screw is what does this. If the screw is withdrawn slightly, the natural tension in the vibrator blade makes it press up against the platinum contact very hard, and it takes a lot of current to produce enough magnetism in the iron core to pull it down. So much, indeed, that the condenser cannot absorb all of the "persisting" current and bad sparking follows. This burns the platinum points, making them rough and liable to stick and the coil generally to behave badly.

On the other hand, if the screw is screwed down too far, it takes the tension out of the vibrator spring, and the latter is too easily pulled down. This causes it to be pulled down and interrupt the battery current before the latter, and the magnetism in the iron core, has reached a high enough value. The secondary current, of course, then never reaches a high value either. Furthermore, the number of vibrations which the vibrator blade makes—and the number of jump sparks in the shower—is reduced, as the vibrator blade is too limp and dead to "buzz" or "sing" rapidly.

A happy compromise between these two extremes is the proper adjustment. It is easily made and locked in most coils. The adjustment should be on the side of firmness, or light pressure against the platinum point of the contact screw, rather than on the side of stiffness or high pressure. Just enough pressure to give a delicate but ready buzz is best. It will make the contacts last forever without cleaning. The loud, strong, high-tension buzz, which so many people seem to prefer, means high pressure, high current and wasting contact points and rapidly discharged batteries.

This is the intelligent manner in which the spark coil adjustment should be made. Now what is the usual manner?

When anything goes wrong, or is suspected of being about to go wrong, the contact adjusting screw—the conspicuous one—is immediately sought out and "readjusted." Even if the batteries have grown weaker, or the previous adjustment of the coil was inferior, this screw is not the one to best effect a readjustment. In 99% of the cases, if the vibrator needs readjusting, it is its tension or pressure against the contact screw that is wrong—not its distance from the iron core.

But since the contact or distance adjusting screw is the most conspicuous, it is the one that comes in for the adjustment in the majority of cases. Usually the screw is screwed down because it seems to "buzz" or "sing" louder this way. This gives the high pressure with its attending troubles, and the poor motor has a well-developed case of "coil adjustment."

If a coil really needs readjusting one who understands what goes on in the coil merely glances at the distance between the iron armature and the end of the core to see if it is about 1-16", and turns his attention to the tension adjustment. He tries this, and after assuring himself that the platinum contacting points are smooth, he reduces the tension to the lowest amount that will give a fair "buzz." He knows then that the vibrator will pull down before the current has gotten too high and yet high enough, and if his trouble persists he looks elsewhere—and finds it.

Beware of too strong vibrator tension and the general temptation to correct all difficulties by adjusting the distance screw.

External Spark Gap.—And now, in conclusion, a word about the external spark gap—the auxiliary spark sometimes made outside the motor, for which so much was at one time claimed.

This consists of a gap or break in the secondary circuit in addition to the gap between the spark plug points. We have been told that it "intensifies" the regular spark or makes it

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a better and surer igniter. What it really does is to overcome the effects of an oily or sooted spark plug. The oil or soot on the porcelain in the vicinity of the sparking points is a conductor of high-pressure electricity. The current leaks across through the oil or soot so freely that the pressure cannot build up to the jumping point. It is like trying to burst a tire by pumping it up while it has a bad leak. The pressure falls away so rapidly, due to the leak, that a bursting pressure cannot be attained.

But when the external gap is placed in the circuit there is one gap anyway, and no matter how oily or sooty or leaky the plug may be the pressure can rise. When it rises to the jumping point it jumps the external gap and thereby causes a disturbance which is so great that the current has no time to follow the oil and soot, but actually jumps it, and makes a spark. It is one of the wonderful peculiarities of the interesting little jump spark. The external gap is merely a clever and ingenious means of ensuring the building up of electrical pressure, notwithstanding a bad leak which may exist through oil or soot.

This completes the story of the "jump" spark. It is generally one of the least understood of all the features of our modern motor car and yet one of the most entertaining to study and advantageous to understand.

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OF a surety the widow of Richard Wagner is music mad, and the municipal authorities of Bayreuth are madder. We thought the limit had been reached a year ago, when the hysteric widow went to law here to try to prevent one of his works being performed in America, because it was a profanation that it should be performed anywhere else than the place of its origin, especially such a place. This year, however, she has gone one better; she has declared that the noise of the touring motor was out of harmony with the poetical atmosphere of "Bayreuth," and the authorities have prohibited motors entering the town. Yet, evidently, there are donkeys galore in Bayreuth, and that their "he-haws" are strident enough is self-evident. Won't they now pass the edict of death on the night-prowling cat? and curse the necks of all the impertic roosters to be wrung?. May as well go the whole hog!

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DEAR R——:

We have had our first adventure or series of adventures, and have come out all right. You know that from Pau we went up into the Pyrenees to Eaux Bonnes, etc., a charming trip up a valley, on a fairly level road. On Wednesday we went to Cauterets and Gavarnie, along another road, and up another valley with a rather stiff climb at the end, which, however, we negotiated without trouble. It was very beautiful—very, and well worth "doing." The next night we were due to sleep at this place (Luchon), also up a valley on a good road. But instead of going down and out of the mountains and coming back again up the other valley we were advised to take a road across some passes; and in the innocence of our hearts we started without other preparations than an 11 o'clock *dejeuner* to give us a long afternoon. We only had about 100 kilometres to do.

After a while we struck the road and began to ascend. We went on and up, on and up, on and up, until finally we reached a point where we could see our road ten miles ahead, reaching 3,000 or 4,000 feet up over the top of the mountain. We looked at each other, the chauffeur and I, and grinned. Then we got out and gave the motor a drink and a chance to cool, as we had been an hour on the first gear. On and up again! The scenery was indescribably wild and grand. Finally, we stopped again and gave the motor another drink and on and up! The drive was so beautiful that G—— looked into Baedeker to see if the "wirard-book" didn't say something about the place and found that we were quietly and coolly starting for, indeed we were well up, the highest pass in the Pyrenees, and one of the highest carriage roads in the world! We grinned and—went on and up. There wasn't anything else to do, and the road was too narrow to turn in. We skirted precipices 1,000 and 2,000 feet high, and, unlike Switzerland, there was no confidence-giving stone wall bounding the road—at times nothing at all, and at the most a little rim of earth. When about 6,000 feet up the rain began to fall, and the road to get slippery. We stopped and gave the motor a drink, and at the same time got a big stone to put under the rear wheel in case of necessity and then went on and up. We "skidded" and slipped; the motor raced; and we barely crawled. The rain soon turned into a furious thunder-storm, with an accompaniment of hail, and the road lost all semblance of surface. It was most uncanny to be skidding on a road with nothing but space on one side. The chauffeur looked serious. Finally at one particularly steep turn of 180 degrees we stopped—or rather stopped going forward—and then began going backwards. It was no joke at all. The chauffeur shouted, "La pierre! la pierre!" and I was out of that car and had the stone under the rear wheel so quick that the family say they only saw a yellow streak (my mackintosh is yellow) passing them. It stopped us, or I would have been the only survivor.

While that was our moment of greatest danger, it was only the beginning of our trouble. We were stuck on the top (we were within 300 metres of the top of the pass, 7,000 feet high) of the mountain in a pouring rain, and no one, no house, within many miles. B——, who was sick with a gouty throat, got out, got another stone and after the rain let up a little we started the motor, and glided and skipped up a few feet, and stopped again. But we were there this time with the stones. We repeated this until we got on firmer ground and finally to the top of the pass.

At the top we got out dry wraps and shoes, and made ready for the descent, the rain in the meantime having almost stopped. I was afraid we would slip going down, and we started very cautiously; but we made the descent safely and comfortably. I forgot to say that while stuck at that turn (180 degrees), when we couldn't go on, little stones were continu-

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— MONITOR TYPE —



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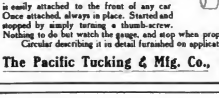
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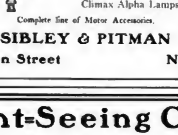
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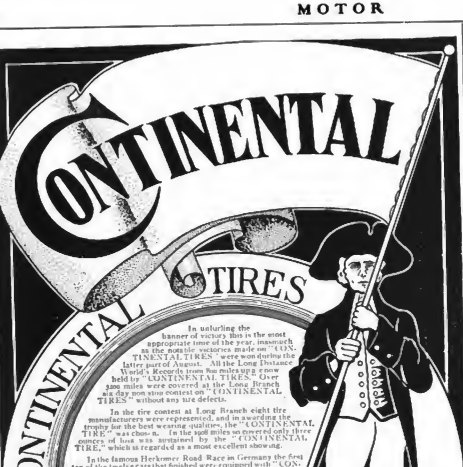
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ously rolling down the mountain side in front and in rear of us. We were in the track of a stone slide, and it didn't add to our comfort to think that at any minute a big stone might be dislodged by the rain. I didn't say anything about it, but I found out afterwards that every member of our party had noticed the same thing, and also had said nothing. It was 4.30 when we got to the valley and found that the road ascended again at once, crossing the famous Col d'Aspin, the most beautiful pass in the Pyrenees. We went up without trouble, had our gorgeous view of snowcaps and glaciers, and descended into the next valley, only to find that the road went over still another pass before reaching Luchon. 6.30 p.m. by this time, but clear weather! We had done the last pass so well that we went on. Thirty-three kilometers to make, 19 up and 14 down! While climbing we met a carriage with four horses descending. The people in it stopped us and said that the pass was blocked by an avalanche and that we could not go on. I asked if they had come through, and they said they had, but that a motor car couldn't. I didn't believe them, being loyal, and so we went on. Then some peasants stopped us and told us the same thing. But we went on. Then the district road mender saw us coming and told us the same thing. After considerable talk he said that he could dig a way for us through the avalanche in an hour; so we took him aboard and went on, eight persons, eighteen pieces of luggage and a heavy car. The motor took us up, its third pass for the afternoon, without a pause. It certainly did its part nobly all day. We reached the "avalanche" at 7.30, just at dark, and, as I suspected, it was much less formidable than reported. With the aid of lighting our lamps the mad dug and the boys moved stones and rocks. Then we all got out and the car charged the mess and went over and through it without trouble. At eight p.m. we started our descent. It was raining again a little, but our lights were very good. We had hardly started when to my horror the chauffeur told me his brakes didn't hold. He steered into the bank, reversed his motor, and brought up against a heap of road-mending stones without damage. Both foot and hand brakes had been used up by the two long descents of the afternoon, and there we were at the top of a mountain fourteen kilometres away from hotel or village, at eight o'clock at night after having lunched at 11 a.m.!

It was 9 p.m. before he could get one of the brakes to work a little. Both were so distorted by heat that very little could be done with them. So we started very cautiously to crawl down the tortuous mountain road, using the motor either reversed or on first speed as a brake, until in a few minutes the reheated brake came into play again and acted splendidly all the rest of the descent. There was something indescribably fascinating in running down a long mountain road, in the pitch dark, with only 100 feet of the road immediately in front of us illuminated by the lamps. We enjoyed it hugely, in spite of hunger, cold, and wet. We arrived at Luchon at 10.10 p.m. Were turned away from the first hotel we tried, but found good rooms, a good supper and a warm welcome at a second. To-day we are all the better for our adventures; even B——'s sore throat being cured!

Yours, etc.,
S.
Bagnères-de-Luchon, France.

THE INDUSTRY

PARIS, SEPT. 15.—Messrs. Charles W. Morse, M. Weinburgh and E. C. De Witt, of New York, have formed a syndicate for the purpose of controlling the Mercedes motor car for the United States and Canada. They have closed a contract with C. L. Charley for the period of his contract with the Daimler Company, and the new company will be called the Mercedes Company, sole agents of C. M. Charley, of Paris. The company propose to build, in New York City, a structure which will be one of the largest and most complete buildings devoted to the sale of motor cars.

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New fabrics are shown in the most alluring colors, leathers soft as a lady's glove, light as the finest silk and surprisingly moderate in price have attracted the most fastidious of the smart set.

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Goggles, glasses, gauntlets, etc.

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Control on steering wheel to gas and ignition, no motion transmitted to these levers by movement of steering wheel.
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STUDEBAKER AUTOMOBILE CO., SOUTH BEND, IND.

MODERN MOTOR CARS No. 3
C. G. V.

(Continued from page 45)

is formed an opening for the passage of a divided ring upon which are strung eight helical springs, each two consecutive springs being separated by two washers. In the mounting the two caps are associated by their lave in such a way that the webs shall be separated by an eighth of a circumference, and that each of them shall be interposed between two of the preceding washers. The operation will now be evident. When the motor plate receives an impulsion it begins in its rotary motion by compressing the springs and actuates the other plate only progressively. There is here an arrangement analogous in its principle to the Rafford coupling, except that helical springs instead of rubber rings constitute the elastic couplings. It will be easily understood why metallic springs are here preferable. It will be seen from the figure that the two plates are united in the centre by a ball and socket joint, and that lateral displacements are consequently permitted in all directions; so that whatever the distortion of the chassis the C. G. V. coupling loses none of its advantages.

Another illustration shows the details of the clutch. The flywheel carries a female cone with which engages a leather-lined aluminum male cone, guided by the prolongation of the crank. In reality it does not rest directly upon the prolongation of the crank, since the latter carries two Hess-Bright ball bearings—a large one near the flywheel and a small one at the other extremity. It is the interior ring of the larger ball bearing that slides upon the shaft, while the other interior ring is secured to the shaft, and upon its external ring slides the socket that envelops the clutch spring. The clutch spring contained in the socket envelops the prolongation of the crank. It bears, on the one hand, against the external ring of the larger of the two ball bearings, and, on the other, against the external movable ring of the smaller of the two, the position of which is determined by the regulation of the ball thrust-bearing through a threading on the extremity of the shaft. Owing to such regulation it is possible to give the clutch the pressure desired and to compensate for the wear of the leather.

After the motor has been thrown into gear the spring is made to press against the flywheel on the one hand through the intermedium of the clutch box and the flaked ball bearing, and, on the other, against the ball thrust-bearing, which at this moment no longer rolls. There is, therefore, no lateral thrust against the crank and its bearings, and the thrust-bearing itself, as well as the ball bearings, enters into play only at the moment of throwing out of gear. This clutch is very gentle in its operation, since it has been found possible to diminish its pressure by reason of the large size of the flywheel. Advantage has been taken of such dimensions of the latter to make a ventilator of it. For this purpose it and the clutch box are provided with flat and very wide arms that churn the air and suck it through the radiator.

The entire clutch just described is contained in an aluminum case and is connected with the speed change through a piece that permits of longitudinal play. As for the shaft, that is provided with a universal joint at the place where it enters the change of speed. Owing to this arrangement the dismounting is very simple. After the removal of some bolts, the shaft, owing to its joint, becomes detached, and it is then possible to obtain access to the clutch properly so-called. All that is then necessary to do is to uncover the ball thrust-bearing in order to take out the spring and the clutch box.

The ball bearings in no wise complicate the dismounting. It must not be forgotten, in fact, that the Hess-Bright ball bearings are cylindrical ones, into which the balls are inserted, one after another, by obliquing the internal ring. Springs afterward placed between each ball hold all in position, and the two rings united by the balls can no longer separate. This oblique work of the balls, which seems illogical, but is not, is the rule in the ball bearings of bicycles, and this oblique thrust also exists in the ball thrust-bearings.

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THE BUSINESS WAGON OF FRANCE

(Continued from page 41)

tained in large oil boxes one foot wide by six inches long, bolted to the frame behind the chain sprocket wheel.

Steam was represented by two makers and four wagons. The Gardner-Serpollet did well in the military division, but the Turgan heavy wagon No. 13 was delayed, owing to having to get water about every twelve miles. The boiler on this wagon, which is a water tube, is the same as the well-known English Yarrow, but without their typical bottom water drums. Circulation was also aided by tubes of smaller diameter, which lead from the lower ends of the main water tubes into the steam drum. Each driving wheel was fitted with a compound engine, the wagon weighing a little over six tons; the gear reductions being from crank shaft to counter shaft by chain, two to one, and from this shaft to the road wheels three to one. On the Gardner-Serpollet big omnibus the reductions were two to one and four to one. These reductions are intended to permit these heavy wagons to climb the steep hills without any trouble. The omnibuses are certainly comfortable passenger vehicles, free from disagreeable odors or heat and remarkably silent, and it is evident from this that there is room for steam practice in motor passenger vehicles.

The route selected for the trials indicated good judgment on the part of the commission, because it brought the population of small towns in close touch with the motor wagon, and business men were given full opportunity of inspecting the cars at the exhibitions held in the different towns. To the agriculturist especially it was a great object lesson—that of transporting loads in country districts up and down hill wholly without effort and at four times the speed of an ordinary horse-drawn wagon, and that without rest and from morning till noon and from noon till night.

On the return of the vehicles to the Tuileries they were welcomed by a tremendous crowd. In conclusion, in speaking on the subject of the next trials, the Marquis de Dion said that a trial of this important character could not be held annually because it would be asking too much of the makers, and that progress in the art of making motor wagons could not possibly be so rapid as to justify annual trials, and that, therefore, the next industrial vehicle meeting would be held after a lapse of one year, in 1907, and that in his opinion a meeting every two years would be eminently satisfactory to both maker and user.

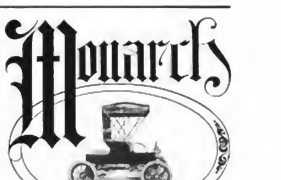
THE PRESENT STATUS OF MECHANICAL FLIGHT

(Continued from page 37)

would be one of its inherent qualities, and it could remain in the air at any point or it could alight as gently as a dove in any predetermined place.

The motion of a bird's wing has been shown by Dr. T. Bayard Collius and also by the experiments recounted in MOTOR for September, to be, not a series of up-and-down strokes, as it appears to the casual observer, but a series of ellipses, proving that the wing revolves as in a cone. As the experimentalist has pointed out, it is not necessary that the complicated movement of the natural wing should be imitated, nor is it probable that it would be desirable to do so, even though it were possible, but an identical effect could be provided by a revolving wing that would strike its effective blow on the down stroke and would return to its first position ready to deliver its next stroke without having to overcome the resistance of the air—then, under such conditions, the beating wing would become essentially an aeroplane with arcuated surfaces revolving about a centre.

It must not be inferred that I am proposing this latter scheme as a new one, for various forms have been evolved, several of which seem to offer the long-sought-for solution, and could these be tried out with anything like the degree of thoroughness that has been given the gas-bag and the aeroplane, there is little doubt but that the air-ship would soon be ready to follow the commercial career of the motor car.



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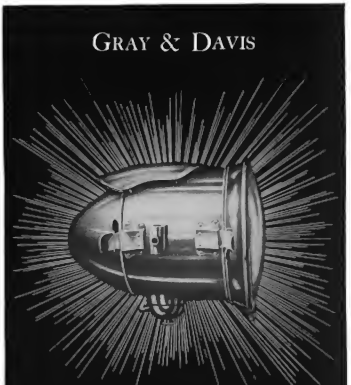
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THE CAR OF THE TIRE TEST

(Continued from page 49)

release is employed for the changing of gears, while the throttle is operated by the foot, leaving both hands free to steer. The timing of the spark is regulated by a small lever on the steering post near the wheel.

Two powerful brakes are fitted. The foot brake operates on the drums of the rear wheels and is provided with a ratchet that will hold them in any position. The emergency brake is operated by the clutch lever and acts on a drum on the shaft.

The car is shaft driven, the shaft employing two universal joints. The crosses are especially constructed to hold enough grease to run several months without replenishment. A thrust roller takes up all the side thrust and keeps the bevel gear in perfect alignment. The thrust roller fits on a smooth face opposite to the driving pinion. The roller is accurately fitted and then hardened. It is supported both top and bottom by a sufficient bearing surface to hold it up to its work. Hyatt roller bearings are used throughout in the rear axle. No balls whatever are used in this part of the construction.



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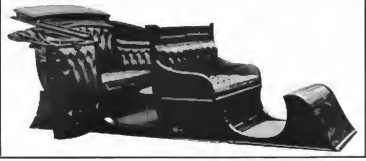
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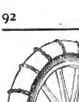
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doesn't care a snap about snow or ice or mud or sand, or steepest hills. Safe, easy travel under all circumstances are assured to users of this ingenious device.

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(Continued from page 32)

Country	Machine	Motor Power	Driver	Position	Troubles
France	Panhard	90	Heath	Completed (won)	
"	"	90	Tarte	Tenth circuit	Rear tire came off
"	"	90	Teste	Fourth circuit	Faulty ignition
"	Clement	90	Clement, Jr.	Completed (second)	
"	DeDietrich	80	Gabriel	Seventh circuit	Broken pump connection
"	Renault	60	Bernin	Second circuit	Broken propeller shaft
Germany	Mercedes	60	Campbell	Completed (third)	
"	"	60	Luttgen	Stopped by referee, eighth circuit	
"	"	60	Hawley	Fifth circuit	Broken spring crossing railroad
"	"	60	Arents	Second circuit	Upset and mechanic killed
"	"	90	Werner	Second circuit	Jammed brakes at railroad crossing
United States	Pope-Toledo	24	Lytle	Completed (third)	
"	"	60	Webb	Sixth circuit	Ran into a tree
"	Packard	30	Sehm't	Completed (fourth)	
"	S. & M. Simplex	75	Croker	Stopped by referee in sixth circuit	Tire troubles
"	Royal	33	Tracy	Second circuit	Cracked cylinder
Italy	FIAT	90	Wallace	First circuit	Clutch troubles
"	"	90	Sartori		Clutch troubles

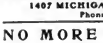
TOO MUCH OF MANY GOOD THINGS

(Continued from page 60)

Take a newspaper directory and compare the number of periodicals dependent on the motor-car trade for existence with those devoted to any other interest, and the result will be astounding. Half the number could be dispensed with without loss to the public or the industry. But which should survive? is a question I have been often asked since I ceased to be a publisher. Here is the list, and my reasons therefor: First and foremost, Motor, of whose excellence it would be injudicious for me to write to anyone who reads these pages. In a class by itself, it has no rival, nor is it likely to have. Among the weekly trade papers I would put "Automobile" first. It is clean, reliable, and undoubtedly has the circulation to repay its advertisers. Next comes "Motor Age," with the whole western field practically to itself, exceedingly well edited and possessing that energy and up-to-datedness which has made Chicago famous. The third weekly paper, "Horseless Age," is the best technical paper published in the trade. "Motor World" is essentially a trade paper and one of the cleverest trade papers in America to-day. To these five I would add one more, the "Cycle and Automobile Trade Journal," of Philadelphia, the directory and handbook, without which no motor-car store or garage is fully equipped. Of the rest, the less said the better. They are *de trop*, and the sooner their proprietors and advertising patrons recognize the fact the better for all concerned. Their existence is a burden and a tax upon a public and an industry already surfeited with too much of too many good things.

Acme of Perfection *American made car of Foreign design.* *FIVE MODELS*
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Automobile "CROVENETTE" WIND and RAIN COATS
Cost you but $10.00 at
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This agency is direct with the works and all commission houses have been entirely eliminated. This new arrangement will permit of the cars being sold in future on better terms than the past, and will also insure more prompt deliveries and better service. . . . . .

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KALAMAZOO, - - MICHIGAN

SMALL STRONG QUICK

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TWO PUMPS IN ONE
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When you carry the third person on this little seat will allow all three to ride with comfort. It is placed between the two occupants, taking only about two inches space on the seat, and can be adjusted to height. When not in use may be folded in compact form.

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16-18; 24-30; 45-55 H.P.
Vertical Four-Cylinder Types
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GASOLINE RAILROAD INSPECTION CAR

(Continued from page 46)

seventeen inches for the guide wheels and four-teen inches in diameter for the drive wheels.

The car now used by the Engineer of Maintenance of Way carries four passengers and two men to handle it. It weighs six hundred pounds. The motor is of the two-cylinder, air-cooled type, and is 3¼ inches in diameter. Both wheels are seventeen inches in diameter, the drive sprockets containing sixteen and eight teeth. The car can be run at thirty miles per hour and is geared direct.

Another type of inspection car, which has been ordered and which will shortly be put in use, has a single-cylinder, water-cooled vertical engine of about six m.p. It is equipped with planetary transmission, giving two forward speeds and one reverse. Ignition is by jump spark and dry cells. A system of forced feed lubrication is used. The wheels are twenty-two inches in diameter, with wood centres, the axles being fitted with roller bearings. Four people can be comfortably carried in this car, the rear seat being detachable, and as an aid to comfort the car is mounted on four one-half elliptical platform springs. The speed of the car is about thirty miles per hour, but can be controlled to three or four miles per hour. Outside of its flared railway wheels this car in its mechanical construction follows very closely general touring motor-car practice.

A TRIUMPH OVER DUST

It is so seldom that the motor car gets its due, that one feels inclined to crow when it happens, and especially when it happens as the result of a road race, where more often the populace is represented as up in arms at the abominations the motor car works on roads set apart. But a year is time for reflection and observation, and it is a year since roads within sight of Seaford and Wantagh were allowed to be, for a day or two, under the control of the abominated motor car. Thrice blessed be those days, say the envious neighbors all around, in humble petition to the supervisors of Nassau County, L. I. For why? Because "a year ago portions of roads in the county were oiled for the purpose of holding motor-car races over them, and there is still no dust from these roads, while on the section where your petitioners live, between Seaford and Wantagh, which were not oiled, there is so much dust as to be a nuisance, making life in the houses near the road almost unbearable, and doing much damage to grass and all crops near the road." That's right, indignant citizens, go after the supervisors with a big stick, and sue them for damages! They could do what the motor-car authorities did in a day, prevent dust. But they don't! Make them, or turn them out!

MY MOTOR

What is't that takes away the blues,
And life presents in roseate hues?
I name it, though you know the news,
My motor!

What takes me, goggle bird, to see
The lady of my love—to be—
And no one knows, but her and me?
My motor!

What fulls me in the lap of joy,
And makes me feel again a boy?
'Tis you, my middle-age's toy,
My motor!

What makes my envious neighbor squirm,
And wriggle like a new-hooked worm,
Altho' it's none of her concern,
My motor!

What takes me into town for "biz,"
And saves enough to buy my fizz,
And runs me home at night?—Gee whiz!
My motor!

THE OWNERS.

BOILERS

7 Distinct Styles: 160 Sizes
Our Specialties: Expansion Joint Fire Plates, Flat Head Tubes, Guaranteed Repair Work.
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No Carpenter required. Can be erected complete in two hours by unskilled help. Prices, $75.00 and up.
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Largest Makers of Auto Houses in America.

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The largest and best equipped repair shop in America.
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Fatents all muffler has to boast—the others expand or swelling to the size of the exhaust. A vacuum is created in the muffler which draws the burnt gases from the motor power system. Send for catalog and price. P. E. Smith & Co., Utica, N. Y., U. S. A.

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Of All Sizes and Dimensions
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Quickest to adjust, easiest to put on, cheapest in use. Will fit any size tire.
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Lamp and auto covers, tool rolls, leggings and other auto fabric supplies.
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Light, strong and handsomely finished. Three models. Guaranteed for one year.
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Write for catalogue that will pull you all about them.
RELIANCE MOTOR CYCLE CO., Addison, N. Y.



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HARTFORD, CONN.
Radiators and Coolers of Every Description

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SIDE-WIRE TIRES

save money—because of their durability. They save work because they require absolutely no attention after fitting. They save worry, because of the sense of *security* that accompanies their use.

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For use on commercial vehicles the "Firestone" is the *only* safe tire. We have thousands of letters to prove that after exhaustive tests the "Firestone" proved best—Better write for further evidence.



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Send us a sample of one of your difficult welds, and solve a problem that is

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Our equipment for welding by electricity is unequalled in this country. We save you money and do the work neater, quicker and without trouble to you—*and we eliminate competition.*

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The car that has been consistently successful in the past can be depended upon to be more successful in the future

Each successive model has added to the Packard record for endurance and reliability and that unequaled smoothness of running.

The latest model, the New Packard 24, upon which will be concentrated every thought and every facility of the Packard factory during the coming season, has already proven itself to be the best thing we have ever turned out.

On June 8th the first car of this model made the run of 300 miles from Detroit to Chicago in the total elapsed time of 12½ hours, running time 11 hours, carrying five to six passengers. After a night's rest in Chicago the car made the return journey on the following day, June 9th. This severe test of 600 miles was made without repairs or replacements except to tires.

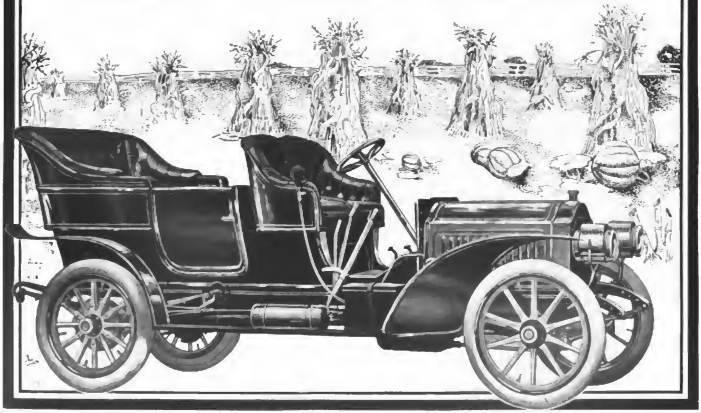
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the construction of which we have studied closely for two years and
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WINTON

MODEL K

Newest and Best Product of America's Oldest, Greatest and Most Successful Automobile Manufactory

MOTOR.—Four cylinder, vertical, water-cooled. 4¾ inch bore : 5 inch stroke. Made of especially tough stock to receive mirror finish and to insure against loss of compression. Crank shafts of specially treated carbon steel, having tensile strength of 95,000 pounds to the square inch. Oil groove in cylinders and pistons. Rawhide gears intervene between metal gears, eliminating noise and reducing wear.

IGNITION.—Jump spark. Accumulator and dry cells carried in locked box on running board. Roller contact commutator, with hardened steel contacts. Motor can be started from seat. Magneto equipment at purchaser's option.

LUBRICATION.—Eight-feed Hill Precision Oiler, with sight feed attachment, placed on dash. Absolutely forces oil through each feed at comparatively low pressure. No air pressure. No gravity feed. Transmission gears run in oil bath.

CARBURETOR.—Special Winton carburetor, manufactured exclusively for us by the Holley Bros. Co. Float concentric with aspirating nozzle. Assures economy of fuel, consumption being ⅄ pound of gasoline per h. p. per hour.

TRANSMISSION.—Individual clutches, the only system recognized as legitimate in mechanical science. Indestructible. Remarkable simplicity of manipulation. Clutches take hold gently, because of oil film, avoiding the shocks characteristic of other forms of transmissions. Direct drive on high gear.

DRIVE.—Longitudinal shaft, with special heavy, hardened and ground universal coupling, enclosed in grease-tight metallic case. No chains anywhere.

REAR AXLE (Floating Type).—Special axle steel with tensile strength of 100,000 to 110,000 lbs. to the square inch. Spur differential. Drop forged gears. Special Timken roller bearings. Most accessible axle ever built. Axle, differential gear and differential bearings can be removed without use of jack or pit, car remaining supported by the wheels. No load on driving axle, weight of car being carried on the heavy drawn steel tube (tapered from center to axle ends) which surrounds the axle. Roller bearings and alignment of bevel gears adjustable.

FRONT AXLE.—Exceptionally strong, one-piece, I beam manganese bronze. Tensile strength, 90,000 pounds to the square inch. No welds. Therefore of uniform strength throughout, and always of uniform width, permitting steering connections to fit perfectly.

CONTROL.—Winton Air Governor, covered by basic patents and used on Winton cars exclusively, gives motor an innumerable variety of speeds, all of which are at the command of the driver, without shifting gears or moving levers.

STEERING GEAR.—Screw and nut design. Yoke and block joints. No ball and socket joints.

BRAKES.—Three in number. Braking surface increased 25 per cent. over previous models.

ACCESSIBILITY.—Direct and immediate access to all working parts of motor and transmission. Hand hole covers (8 x 7 inches) on crank case and transmission gear case removed by turning hand wheel. Left half of crank case easily detached to permit quick and easy removal of crank shaft, pistons and connecting rods. Upper half of transmission gear case likewise detachable, affording quick removal of all transmission gears and shafts.

GROUND PARTS.—All cylinders, pistons, piston rings, crank shafts, valves, universal couplings, and transmission shafts are ground to the accuracy of 1-1000 of an inch. This means perfect fitting machinery, absence of destructive friction, the use and not the waste of power, lengthened life of working parts and interchangeability of parts.

TESTED MATERIALS.—With our automatic and autographic 200,000 pounds Richie Testing Machine, we test exhaustively all material where strength is required—such as stock for frames, crank shafts, connecting rods, axles, etc. Consequently we know that the material we use is absolutely safe. We do not guess. Material makers, knowing we test our material, dare not send us poor stock. They know we would refuse it. Hence we receive their first quality material, and their seconds go elsewhere.

SPRINGS.—Special patented Winton Twin-Springs serve as light springs for light loads and on good roads and as heavy springs under heavy loads and on bad roads. Extra length springs behind. Used only on Winton cars.

COLOR OPTIONS.—Body—Brewster Green, Winton Maroon, Royal Blue. Chassis—Brewster Green, Winton Red, Winton Buff, Royal Blue.

For further particulars write to

THE WINTON MOTOR CARRIAGE CO.

Member A. L. A. M.

CLEVELAND, O., U. S. A.

BLANCHARD PRESS, NEW YORK.

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VOL. V. No. 2 NOVEMBER, 1905 25 CENTS

MOTOR



THE NATIONAL MAGAZINE OF MOTORING

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MoToR, 1789 Broadway, New York

Franklin News for 1906

4 remarkable every-day-in-the-year cars



Type E, 1906

4-Cylinder Runabout or Gentleman's Roadster

Two passengers only. No tonneau can be attached, as "*Franklin* horse power." Four cylinder, air cooled engine. Wheel base 84½ inches. 6 more than last year. Makes the car roomier, distinctly more graceful, and easier riding. Force-feed oiler on the dash. Change lever plated inside car and forward. More convenient especially when top is on. and handsomer, 1,100 pounds. Combination steering for tonneau, cape or various top and glass fronts. 40 miles an hour. **$1,400.** F. O. B. Factory.

Full head-and-tail-light equipment.



Type G, 1906

4-Cylinder Light Touring Car

Shaft drive. Sliding gear transmission. Three speeds and reverse. New and perfect disc clutch. Force feed oiler on the dash. Tops or for passengers, four doors, 98-inch wheel-base. 24 "*Franklin* horse power." 1,500 pounds. 45 miles per hour. **$2,000.** F. O. B. Factory.

Full head-and-tail-light equipment.



Type D, 1906

4-Cylinder Touring Car

Shaft drive. Sliding gear transmission. Three speeds and reverse. New and perfect disc clutch. Force feed oiler on the dash. Four passengers, side doors, 110-inch wheel base. 30 "Franklin horse power." 1,800 pounds. 50 miles per hour. **$2,800.** F. O. B. Factory.

Full head and tail-light equipment.



Type H

6-Cylinder Touring Car

Six cylinders. Air cooled. Shaft drive. 4-speed sliding gear transmission. New and perfect disc clutch. Wheel base 124 inches. 50 "*Franklin* horse power. 2,400 pounds. 60 miles per hour. **$4,000** F. O. B. Factory.

Full head-and-tail light equipment.

The oldest, speediest, most luxuriously built runabout ever made.

It has no equal as a business runabout; a superintendent's car; or for a doctor or other professional man; for a salesman; for a substitutante; for 2-passenger touring; or as a speedy roadster for the owner of a big touring-car.

The material and workmanship equal that of the best-made high priced touring-car.

In the long run, it is the most economical of runabouts.

A book completely describing it and showing its appearance with glass front and various tops sent on request.

One of the most interesting and attractive cars in the whole motoring field for 1906.

The ideal light family touring car.

Its 12 "*Franklin* horse power" does all that any 20 horse-power car except a *Franklin* will do.

You cannot buy another car that will do what this does for anywhere near the money.

Money will not buy more luxury and comfort, or better touring mileage in a car of four cylinders or less.—Any excepting the actual 30 horse-power car.

Its patterns are like the G car, but it has larger cylinders, longer wheel-base, and 8 more "*Franklin* horse power." It is roomier and even more luxurious in appointments.

This car combines great power with light weight to a degree never before attained. It is the *Franklin* idea pushed up to the highest notch.

The six cylinders divide the engine force into six impulses, which balance the motor rotation with extreme evenness, produce the utmost smoothness of running and flexibility of operation; and permit tremendous power and speed without a corresponding increase of weight or strain on the car.

Improved Oiler, Carbureter, Clutch, Brakes and Bearings

Bore and Stroke: In Types E and G, 3½". In Types D and H, 4½". Cylinders are cast separately and so designed that the metal is evenly distributed, thus insuring a cooling free from strains and one that will remain permanently round. Cylinders are bored, reamed, and then ground, thus insuring a straight and round cylinder.

Pistons and cylinders are cast to a special analysis, insuring a very tough and close-grained iron, thereby doing away with loss of compression due to porous iron. Three eccentric rings ground round after cutting are fitted to each piston.

Auxiliary Exhaust: A port with valve at bottom of the stroke lets the last high pressure gases out before the main exhaust valve opens; thus reducing back pressure and maintaining the combustion chamber at the temperature of maximum efficiency.

It increases the power of the engine. It keeps the exhaust valves from getting burned and pitted. It keeps carbon deposit out of the combustion chamber almost completely. It positively keeps spark plugs from fouling. It allows the use of graphite lubrication in the engine.

Cooling: Direct air cooling. In Type E it is natural; with no fan. In Type G it is suction-fan wheel is used in rear of engine. In Types D and H there is also a fan on the front. It is positively driven, with no belts or chains to run off or stretch.

Control: Spark control is on wheel column. Throttle control is on steering wheel. The driver has complete control without moving.

Lubrication: A tight, force feed mechanical oiler, on dash, in sight of operator, furnishes oil for all parts of the motor.

Carbureters: We manufacture our own carbureter. Many carbureters are offered on the market and while give satisfaction on ordinary motors are inefficient enough for *Franklin* motors.

Brake Control: Three hand brakes, one on each rear wheel and one on the transmission brake drum. For 1906 these have all been increased in diameter and face until they are more than amply safe. All brakes are double-acting, and each brake alone is sufficient to hold car under ordinary circumstances.

Axles: Front axle is made from nickel steel tube. This insures light-ness, rigidity and a superabundance of strength. Yokes and knuckles are of nickel steel.

Rear axle is of nickel steel, especially treated, and of from 48 to 60% tensile strength per square inch. Differential gears are in oil-tight case. Differential and bevel drive gears are made from nickel steel forgings.

Franklin Air-Cooling, Lightness, Strength, Springs

All *Franklin* cars can be used right through the winter. No weather can freeze them. With air-cooling there's nothing to freeze.

When topped they are perfectly comfortable in any weather. They are the strongest cars of their weight; the lightest cars of their power.

They cost fifty per cent. more per pound to build than any other cars.

Their great strength, lightness and perfect spring-suspension make them safe and comfortable when driven at speed on rough roads.

No heavily built car can safely be driven at speed over average American roads. Neither the car nor the passengers can stand it.

The high-power *Franklins* cool as completely and perfectly as the runabout, in hot weather or at a hot pace. The proofs fill a book. If you want it, we'll send you the book.

All *Franklins* are remarkably quiet.

Franklin touring-cars do the same work as the heaviest highest-priced cars; but are easier to ride in, to handle and to care for; more enjoyable, safer and vastly more economical.

Franklins save fuel, oil, repairs and, above all, tires.

They are sold under a strong and definite guarantee.

The *Franklins* shown here are not only up-to-the-minute cars of the season, but their far-advanced design and detail perfection will make them favorite and standard cars for many seasons.

"The Motor Car of the Future"

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Our elevator service is unique, inasmuch as it is specially constructed to our own specifications. One of the lifts is equipped with a turn-table, so that when a machine enters it from the street or building it can be turned in any direction desired before leaving.

The machine shop equipment is unequalled in the city or elsewhere, and has facilities for executing every conceivable repair or alteration required in an automobile.

In our supply stores we carry an exceptional stock of spare parts for both foreign and domestic machines and accessories of every description. Our stock of patterns, tools, jigs and fixtures enables us to duplicate at short notice parts of the most intricate description.

The electrical storage department will meet a long felt want. It is conducted by men who are not only manually familiar with every detail of the proper maintenance of electrical vehicles, but who have been associated from the early days with their design and development.

We have not neglected the convenience of chauffeurs and have made ample provision for their necessities, besides equipping a comfortable waiting room on our Broadway frontage in such a manner as will keep them within constant reach of their employers.

An Announcement of Importance

In addition to the Panhard and Renault Automobiles, for which we are exclusive licencees, and our own S. & M. Simplex, we have just closed a contract with the Mercedes Import Co., sole representatives of C. L. Charley, Paris, under which we become exclusive agents in the United States and Canada for the

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Lady's Car for Town and Country. From two to forty miles an hour

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CHARRON, GIRARDOT & VOIGT

PUTEAUX, FRANCE

Important Announcement

The motor cars sent to this country by the firm of Charron, Girardot & Voigt, of Puteaux, France, began to attract attention when wealthy men of New York City bought their third, fourth, and even fifth cars of this make in the one year, 1904-5. The C. G. V. car has been favorably known abroad and used by royalty and the nobility in France and England for several years, but it was not until the season just passed when Em. Voigt, one of the firm, came to this country to introduce the car, that the name has sprung into real prominence here.

One of the earliest C. G. V. models is still running in New York City in perfect condition, after nearly 60,000 miles of the roughest use over American roads. When motorists of unlimited wealth buy more than one model of a car in the same season, no greater commendation of a car could be found.

In design the C. G. V. car is unquestionably superior to any other motor car ever manufactured, having the experience and ability of such famous motorists as CHARRON, winner of the first Gordon-Bennett Cup, and GIRARDOT, winner of the second Gordon-Bennett race, behind it.

In quality of material used and in workmanship the C. G. V. car positively cannot be surpassed, and in spite of its great success the firm will this year limit their output to 350 cars. This means that the same infinite care and labor necessary in turning out a perfect motor car will be seen in the 1906 product. There will be no "rushing" of the factory.

A splendid description of the features of the 1906 C. G. V. will be found in the October *Motor*, pages 44, 45 and 46, and this article, from the pen of a great mechanical expert, is worth reading by every motorist in this country.

The 1906 models are four in number, meeting every want, from the lower powered TOWN CAR for the theatre, shopping, park riding, etc., to the 50 H. P. touring car, seating eight people comfortably, and with power enough to take this number over any hill or on any road.

The price ranges from $4,000 to $8,500, for the chassis delivered in this country. As the factory output is limited the number of cars for sale in the United States is comparatively small, and to insure prompt delivery it is advisable to place the order now. There is no need to wait for the show, for the C. G. V. car in design, workmanship and material is absolutely unsurpassed. Catalogue on request of Mr. Em. Voigt.

Important Announcement

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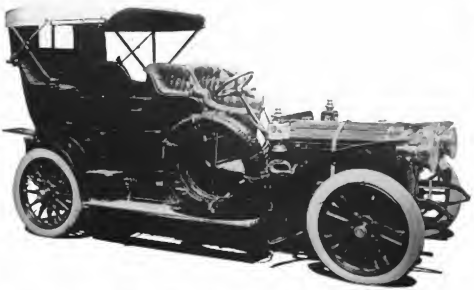
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ANNOUNCEMENT

THE 1906

Rainier

30-35 H. P.

has arrived. Come and inspect, ye automobile experts—you who really appreciate beautiful workmanship and design—and you will admit that at last THE American automobile has come. Look over the following specifications, then call and try the car.

Engine.	30-35 H. P., 4 cylinders, water cooled.
Ignition.	Sims-Bosch Magneto—make and break spark.
Transmission.	Sliding train. 3 speeds forward and one reverse.
Rear Axle.	Bevel gear drive, clutch driven hub. Ball bearings.
Front Axle.	I Beam section. Ball bearings.
Frame.	Cold rolled pressed steel, aluminum under bonnet covering entire engine and transmission.
Wheel Base.	104 inches.
Wheels.	Imperial whalebone, grade A and growth hickory.
Tires.	Continental 34 x 4.
Valves.	Mechanically operated, inlet and exhaust interchangeable.
Carburetter.	Float feed, requiring no adjustment.
Brakes.	Two internal expansion, dust protected, operating on rear hubs, through emergency lever, holding either forward or backward. Foot brake operates on propeller shaft. Both brakes bronze against steel.
Body.	Full aluminum, double side entrance.
Equipment.	Two head lights, 2 side lights, 1 rear light, 1 horn.

Price, $4,000

The 22-28 H.P. will be continued as heretofore, without any changes.

4-cylinder—98 inch wheel base—La Coste coil. French battery. Continental tires. Aluminum side door body.

Price, $3,500

BOTH MODELS GUARANTEED FREE OF REPAIRS FOR ONE YEAR

The world's broadest and most liberal automobile guarantee. Landaulet bodies for immediate delivery. Limousines for October and November delivery.

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There can be no more conclusive proof of the superiority of the Pierce Great Arrow chassis for touring purposes. An American car for American roads—the Pierce is the triumphant result of six years' experience with the finest materials and a thorough knowledge of American conditions.

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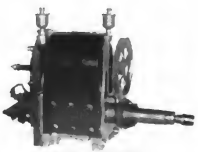
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Delaunay Belleville



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To secure early deliveries, orders should be booked now as deliveries will be made in rotation



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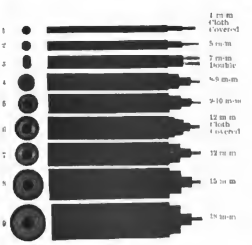
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The NEW Type XII, 35-40

POPE-T

PRICE $3,500,

Some advance and interesting data on the LATEST and GREATEST achievement of the WORLD'S LARGEST AUTOMOBILE PLANT.

MORE POWER, MORE SPEED, MORE ROOM, MORE STYLE, MORE STRENGTH—LESS WEIGHT.

Every one in the trade **the world over** is now familiar with the unparalleled and unapproached record of the justly renowned **Pope-Toledo.** A few months ago we could not ourselves see that it was possible to produce a better car than that with which we **have won every notable speed, endurance and hill climbing contest.** But our wide experience, new methods, new and improved machinery, large quantities, and **above all** the **highly successful** culmination of experiments in **specially treated steels,** which have been in progress for the past four years, have enabled us to produce in Type XII a **car that is a long step in advance** of our fondest wishes or expectations.

Motor Four Individual, Twin Head, Cylinders, 4-cycle Copper Jacketed, developing **under brake test** 43 to 44 H. P. Water Cooled by the matchless Pope-Toledo Radiator. **All gears encased.**

In this space it is impossible for us to go into any deep exposition of the many points to be considered in producing the highest efficiency for the least weight in gas engine design. What has been accomplished in the Pope-Toledo in this respect might be tersely stated in the claim that in this now highly efficient motor **the very remarkable result** has been attained of **SECURING ONE H. P. FOR EVERY TEN AND EIGHT-TENTHS POUNDS OF WEIGHT,** and this, too, **without** in any sense **sacrificing** the **strength** or wearing parts. This proportion of weight to horsepower has not been achieved by any mere laboratory test, by running the engine at an impractical speed, but under the ordinary conditions which prevail.

Ignition Jump Spark, Coils and Batteries. Provision made for Magneto. Control is simple, flexible and positive. The car can be driven **on high speed behind a team walking** or up to its maximum speed, **simply by the use of throttle and spark,** both located on the Steering Wheel.

Control The **Pope-Toledo** Engine has been developed to such a point of efficiency that we are now able to run it from 200 R. P. M. to 1200 R. P. M., at which point it delivers its greatest efficiency. It is not only exceedingly **quiet under all conditions,** but the use of a scientifically constructed Carburetor gives **great latitude of power** to the engine **at varying speeds.** Heretofore Carburetors have been generally adapted to deliver their greatest efficiency to the engine at a maximum speed. The Pope-Toledo Carburetor is developed to such a point of fineness, that it is **self-adjusting** to all conditions of speeds, so that **with the Spark and Throttle alone,** and always **on the high gear,** you can drive a Pope-Toledo **anywhere,** taking all ordinary hills without rushing them and without shifting gears.

Transmission Transmission is of the Sliding Gear type, three speeds forward and reverse, being **absolutely direct drive** on the high gear with **no idle gears** in mesh. Ball bearings at all important points. The Transmission on Type XII is **one of our great forward steps,** mentioned above. The steel we use in this transmission, of **210,000 pounds tensile strength,** will play a most important part in the future development of the Pope-Toledo. True, it is very **expensive to make** and still more **expensive to work.** By its use we are enabled to produce not only the **lightest,** but the **strongest** and **most efficient transmission ever placed in any automobile.** This steel is of the finest quality, more expensive and harder to work than any used by any maker in Europe. While it is true that some of the European makers use some very fine steels, we do not hesitate to say that the steel herein mentioned is **superior from every standpoint** which **we have proven** to our own satisfaction by **every known test** and **by actual experience** from using it in the cars themselves **under the most severe and arduous road conditions.**

Frame All steel Frame **of few parts,** tested to a safe load away above what is required. All steel, light, flexible and strong, making the car very **easy to ride in,** and **easy on both tires** and **engine.**

Double Direct Outside Chain Drive

At this stage of automobile development, but few arguments need be advanced to show that on the score of efficiency, which means **reduced friction, weight** and **durability,** the chain system of power transmission **AS APPLIED TO LARGE AND POWERFUL TOURING CARS,** is a long ways ahead of the Cardan Shaft **from every standpoint.** We give herewith a table of exhaustive tests conducted in France in the past year to determine this point.

It has been thoroughly demonstrated, and **engineers are agreed,** that bevel gears are not as high in efficiency as Spur Gears, and that Chain Drive shows **greater efficiency, longer life,** and **less loss of power** than either Spur or Bevel gear. Recent French experiments on the efficiency of Bevel gears, Spur gears and pitch chains, as applied to motor cars, **prove beyond question** that **the chain drive is decidedly superior.** The results of these experiments are as follows:

	NEW	WORN
Roller Chain, Lubricated and exposed to dust	94%	92%
Bevel Gear, Steel on Steel, Running in Oil Bath	88%	82%
Spur Gear, Steel on Steel, Running in Oil Bath	92%	90%
Spur Gearing, Leather Pinion, Cast Iron Wheel	88%	80%
Spur Gearing, Steel Pinion and Fiber Wheel	88%	80%
Spur Gearing, Steel on Steel, greased and exposed to dust	90%	80%

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H. P., "Quiet-Mile-a-Minute"

OLEDO

POPE Toledo AUTOMOBILES

FULLY EQUIPPED.

Chain drive is **decidedly** more **flexible** and **efficient,** requires **less care,** and on account of its flexibility, the motor and transmission and chassis are **not subjected to violent shock.** The matter of repair and replacement is **infinitesimal** as compared with bevel gears. You can tow a car with a broken chain, but you cannot do so with a broken bevel gear; and the older and more worn the gear the more power it consumes. Isn't it significant that in the elimination trials for the Gordon Bennett Race, in which out of 70 or 80 cars the best three from each country were to qualify, that notwithstanding **over 50% of the entries were shaft driven,** out of the entire lot **only one shaft-driven car was able to qualify.** In the race **this car was not able to even make a showing** against all the chain-driven cars.

Brakes The Pope-Toledo system of Brakes is incomparable. Both foot and emergency brake act on the hubs of rear wheels, which are very efficient and easily adjusted to wear.

Gasoline Capacity 17 gallons, sufficient for 270 miles—from ½ to ¼ more mileage for the same quantity of gasoline **than any car in the world.** Gravity feed to Carburetor.

Axles The Axles on Type XII are of the I Beam Type, FORGED IN OUR OWN PLANT of the best steel obtainable, being tested to **110,000 pounds tensile strength.**

Wheel Base 104 in.—Standard tread, 54 in.

Wheels 34 x 4, front and rear. We make all of our wheels here in our own plant. **All wheels spoked and assembled by hand.** Ball bearings of large dimensions.

Body Design Entirely new and original, along beautiful lines, distinguished and distinct. Double side entrance. Very large and roomy tonneau, **especially easy of access.**

Front Seat and Tonneau **Of Mirror Finished Steel,** large and comfortable front seat divided. Deep and heavy upholstering.

Hood and Guards Improved Hood opening from either side. Guards oval shaped, **made of aluminum,** following curve of wheels. Front guards large and flaring.

Tires We shall adopt for regular equipment **the best tire on the market,** determined by observation and our wide range of experience. Rims also of standard sizes, admitting the use of any Foreign or Domestic tire.

Equipment Full set of lamps, horn, tools, floor mats, tire pump and jack. A very complete outfit **of the highest quality.**

Proportion of Horsepower to Weight Not further back than a year ago it was considered good practice to have 100 pounds of car weight to one horsepower. How much has been accomplished not only **without the sacrifice of strength,** but by **actually increasing strength and durability,** can be best understood by stating that the new model Pope-Toledo has **ONE H. P. FOR EVERY 54 POUNDS OF WEIGHT.** It seems unnecessary to produce any arguments as to what this means. Certain it is that one of the chief points must be in durability not only to tires (which of course is a most important factor) but also to **all moving and wearing parts.** Experience and deep study of the entire subject of automobile building have demonstrated that to attempt to make a car strong by merely increasing the size and consequently the weight of the parts, not only **does not constitute strength** but is actually **a source of weakness,** for the larger and heavier car is sure to contain within its weight **the germs of its own destruction.** We have aimed therefore to keep **the horsepower up** and **the weight down** without for a moment losing sight of the importance of strength and safety.

Weight Distribution With the weight more evenly distributed in this new model than ever before, it must become evident to any one posted in the art that a great deal has been accomplished not only for the **durability of the machine** but **for the tires** themselves. The even distribution of weight and strength, aside from motor design, has probably received more careful study from us this year than ever before, and has only been possible through the wide knowledge we have gained from the thousands of our cars in use and from whose performance we have been able to apply the proper result in the increase of power and reduction of weight, with increased durability and strength.

We also build Landaulettes, Limousines, and a Gentleman's Roadster of 20 H. P., four cylinders. Special cars built **to order** of 20, 30, 35, 40, 50 and 60 H. P. Further details given upon request.

20-25 H. P. DOUBLE SIDE ENTRANCE, - $2,800
30-35 H. P. FRONT ENTRANCE, - - 3,200
35-40 H. P. DOUBLE SIDE ENTRANCE, - 3,500
50-60 H. P., - - - - - - - - 6,000

And upwards according to specifications.

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The Car for Service

VICTORIA



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TOURING CAR



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THREE FIRST AWARDS IN THE NEW YORK-BOSTON REliABILITY RUN OF 1904

PERFECT SCORE IN THE 600-MILE ENGLISH REliABILITY TRIALS OF 1904

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Another point of interest is that, owing to our unequaled manufacturing facilities, we can make immediate deliveries of all the types here shown.

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What the New York Papers Said About

FIAT

AUTOMOBILES IN THE

Vanderbilt Cup Race

LANCIA, THE ITALIAN.

Virtually the victor in the great contest. He is rammed by an American and is then forced to abandon hope and the battle.

To France the cup, to Italy the glory.

Whatever the figures may say, that was the true result of the international automobile race for the Vanderbilt trophy.

Officially Auguste Hemery, in his eighty horse power Darracq, was proclaimed the victor. Popularly the laurels went to Vincenzo Lancia, in his marvellous Fiat, from Turin, with 120 horse power. More than 150,000 persons who saw the event voiced that verdict at the end.

Flying over the earth like a projectile propelled by some superhuman force and with incredible intrepidity, Lancia led from the start and had literally run away from his competitors when the disaster fell upon him. He had covered seven of the prescribed ten laps, a distance of 196 miles, in 170 minutes, was more than a full lap ahead of his nearest antagonist, and was consistently maintaining this amazing speed with a virtual certainty of breaking all records.—*Herald.*

LANCIA LEADS ENTIRE FIELD

Heading the entire field of competitors by more than thirty miles, Lancia completed the seventh turn at 8:32 o'clock and was greeted with a mighty cheer. He was still traveling at about seventy miles an hour, but notwithstanding his terrific going he turned in his car and waived his hand in appreciation of the cheers.

Lancia, the Italian, would undoubtedly have won but for the collision with Christie. He had broken all speed records up to the time of his accident.—*World.*

LANCIA'S BRILLIANT WORK.

Those who saw the race will understand that it is not unfair to the winners to say that the driving of Lancia, the Italian, was the sensation of the day.

Lancia apparently opened up his Fiat when he received the word "go!" and never closed it down. Foxhall P. Keene, than whom there is no better authority on automobile racing in the world to-day, was unstinted in his praise of the foreigner. Mr. Keene said:

"I never saw such driving before, nor such a smooth running car. There is no one in the race to-day who can follow the pace set by the Italian."—*Tribune.*

Lancia, the favorite, to him belongs great glory, for had it not been for a collision with the Christie in the eighth round, when he was leading the field, after running at 70 miles an hour for the whole distance, he would have undoubtedly won with his great 120 H. P. "FIAT."

When Lancia crossed the tape the spectators gave him an ovation which compelled the stopping of the race.—*Mail.*

The feature of the race was the wonderful driving of Lancia, the Italian, in his Fiat.

Such driving had never been seen in this country before. With six racers behind him and with a generous lead, the race seemed his, barring accidents.—*Sun.*

LANCIA SEEMED A SURE WINNER TILL CHRISTIE RAN HIM DOWN.

Lancia drove a phenomenal race. He set a pace of more than seventy miles an hour. The Italian driver varied hardly ten seconds on any of his rounds up to the time his car was injured.—*Eagle.*

TRAIN RECORDS LEFT BEHIND.

Fastest Railroading in the World Takes a Back Seat for Lancia.

The figures of Lancia up to the time he met with a mishap yesterday, easily eclipse these records. The fearless Italian driver negotiated the first 198 miles of the Long Island course in the incredibly brief period of 159 minutes. So far as is known, this is not equaled by any regularly scheduled railroad train.—*Eagle.*

LANCIA LOST BY ILL LUCK.

When thirty miles ahead his machine is wrecked. Beat a mile a minute. Italian driver made better than eighty miles an hour in straight sections.—*Times.*

Lancia's completion of the seventh round put him a lap ahead of the entire field, something unheard of before in motor racing. His time was 2:49:52, or 169 minutes for 196 miles, an average of almost seventy miles an hour, an unprecedented performance in an auto race either here or abroad. World's records were falling like hail. Lancia's speed was increasing each time. His fastest lap being 23:10 or 72⅓ miles an hour.—*Globe.*

LANCIA HERO OF RACE.

Lancia, of the Italian team, was the hero of the fastest lap, and, though he only finished fourth, 1 minute 55 seconds behind Tracy, the American, he was the popular hero of the race.—*Press.*

Lancia, before his accident, did some of the most wonderful driving ever seen in America. He completed half the total distance of 283 miles in two hours, two minutes and five seconds. This was 142 miles in 122 minutes. Wm. K. Vanderbilt said: "The race was a very great success, and remarkable speed was made. Lancia drove a very fine race, and had it not been for his unfortunate accident would have made a marvelous record for the course."—*Journal.*

Intending purchasers should call and inspect Fiat Cars. Both closed and open bodies now ready—the product of the foremost European and American designers, completely equipped, READY FOR THE ROAD WHEN PURCHASED.

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THE Stoddard-Dayton 1906

SPECIFICATIONS

OF TOURING CAR MODEL "D"

MOTOR—The engine is 4-cylinder vertical, water cooled, 4½-inch bore, 5-inch stroke. Cylinders cast separately and heads integral. Valves mechanically operated. Cam shaft and pump gears entirely enclosed and running in oil. Bearings between each crank. Lower half of crank case removable, leaving bearings intact. Inspection covers in upper half of crank case. Positive and splash lubrication. Will develop 30-35 horsepower.

TRANSMISSION—Sliding gear. Gears running in oil. Case, oil and dustproof. Three speeds and reverse. Timken roller bearings throughout. Direct drive on high gear. Double universal joint between end of propeller shaft and transmission, and also between transmission and clutch, eliminating all end thrust and strain on the bearings. Cone clutch, large diameter, lined with leather.

LUBRICATION—Mechanical-pressure feed oiler. Each feed can individually be worked by hand in case of emergency. Bearings for wheels, rear axle, and propeller shaft packed in grease sufficient for 2,000 miles.

IGNITION—Jump spark, storage batteries, coil on dash. Timer on vertical shaft, hardened steel contacts. Concealed wiring.

CONTROL—Spark and throttle levers situated just underneath the steering wheel, operated by the fingers without removing the hand from the wheel. Two foot pedals, the left one operating the clutch only, the right operating the transmission brake and clutch. Change gear lever on the same shaft as emergency brake lever and is of the selected or H slot type, thereby enabling the operator to change gear without necessitating any intermediate steps.

BRAKES—Three, internal expanding, large diameter and wide face, encased and protected from dust and mud. Brakes on the rear wheels rigidly connected with the hubs, and are of the same type and size as transmission brake. They are interconnected with the clutch. Transmission brake-shoe is interchangeable with those on the rear wheels.

FRAME—Pressed steel made from high carbon, hot-rolled stock. Motor and transmission carried on dropped sub-frame reinforced at sides. Drop forged spring hangers.

FRONT AXLE—Front axle, I-beam section with drop forged yokes, integral with the axle and free from welds. Drop forged steering spindle and arms. Knuckles have hardened steel bushings and bolt.

REAR AXLE—Clutch drive type. Spur gear differential with case-hardened steel gears. Differential casing has extended hubs running in Timken roller bearings. Wheels have Timken roller bearings and run on steel sleeves extending from bevel gear casing. Driving shaft has no weight to support and simply transmits power to wheels. Differential removable without taking off wheels. Propeller shaft entirely encased in heavy, drawn-steel tubing. Casing supported at forward end by ball and socket sliding sleeve, hung from cross member on frame, and therefore acting also as torsion lever. All bearings and bevel gears adjustable.

SPRINGS—30-inch front, 50-inch rear. Single Elliptic, 2 inches wide, made from the best crucible analysis steel.

WHEELS—Artillery, 32 x 4. Timken roller bearings. 12-spoke front, 14-spoke rear. Spokes made from first-class second growth hickory.

TIRES—Any standard American make.

BODY—New design, 4 inches wider in tonneau seat, retaining artistic lines of 1905 model. Side entrance tonneau; divided front seat; seating capacity, five people.

FINISH—Trimming and painting done in our own shops, under our own supervision. Standard color, the well-known Stoddard-Dayton pearl gray, but will paint and trim to customer's own specifications, if desired.

EQUIPMENT—Horn, two oil side lamps. Complete set of tools, tire-repair outfit and pump.

MISCELLANEOUS INFORMATION—Wheel base, 102 inches; thread, 56 inches. Gasoline capacity, 15 gallons. Each car will be equipped with metal dust-pan or apron, protecting all parts under car from mud and water.

PRICE—$2,250.00, f.o.b. Dayton, Ohio, U. S. A.

Runabout—Model "C"—4-cylinder; water cooled; 12-15 h. p.; sliding gear transmission; 3 speeds forward and reverse; shaft-driven rear axle; 80 inches wheel base; wheels, 30x3 inches; price, $1250

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and Accessories for Men and Women



THE exhibition of Automobile Garments and Accessories which we have gathered together for the season of 1905-6 far surpasses anything of the kind ever shown either in this country or abroad.

Scandinavian leather goods have always been our specialty, yet this year's display excels in the great variety of skins, in the softness, finish and coloring of the leathers; while the new models from Paris, Copenhagen and London present every variety desirable.

Everyone who enjoys and appreciates beautiful furs should attend our exhibition. We have been exceedingly fortunate in our selections, the result being the production of some remarkable garments.

Reindeer, Baby Seal, Wild Blue Cat, Mink, Dyed Marmot, Yetta, Civet Cat, Astrakhan, Squirrel, Holland Cat, Natural Seal, Japanese Mink (Colinsky), Tiger Cat, Australian Opossum, Russian Pony, Muskrat, Raccoon, Grey Chinese Goat, Black Dog, etc.



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Suits, tailored-to-order, and ready to wear, in leather and all materials; Separate Jackets and Skirts; Coats, long and short, in leather, cloth, gum-satin, etc. Furs in every variety. Wraps and Capes, Hats, Caps, Hoods, Veils, Gloves, Gauntlets, Goggles, Lap Robes, Boots, Foot Bags, etc.



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Suits and Coats of every description in cloth and leather, and all serviceable automobile furs. Jackets, Knickerbockers, Leggins, Boots, Coats, Caps, Gloves, Gauntlets, Goggles, Lap Robes, Steering Aprons, Foot Warmers, etc.



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Fur Coats from $15.00. Full leather outfits from $25.00. Cravenette Suits made to order.



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We have just issued our ***new Catalog C***—200 illustrations—which we will be glad to send anyone interested.

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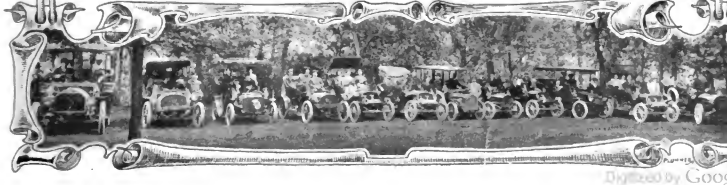
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MOTORING and PIONEERING

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VOL. V. No. 2 NOVEMBER, 1095



ROYALTIES WHO MOTOR

By Fritz Morris

EVERYWHERE the motor car is a means of diversion. Motoring is more than ever not a fad, and everyone motors who may. It has become a serious diversion of the royalties of Europe. Although nearly every royalty is a motorist and owns his or her own motor cars, the royal family of Great Britain holds the record.

King Edward was one of the earliest of royal motorists, and he still has more cars in his garages than any other crowned head in the world. His new Mercedes is a handsome one of claret color, picked out with red, and upholstered in dark blue buffalo hide. It has an electric headlight fitted to it, and a speaking tube for communication with the chauffeur. The driving seats are sheltered by side curtains that may be rolled up out of the way into the roof, and the front and side windows may be lowered so that the car can be fully opened to the air. The rear tires have steel-studded, leather treads, but the front covers are plain. King Edward is not a scorcher, but contents himself with comfortable going —as becomes his kingly dignity.

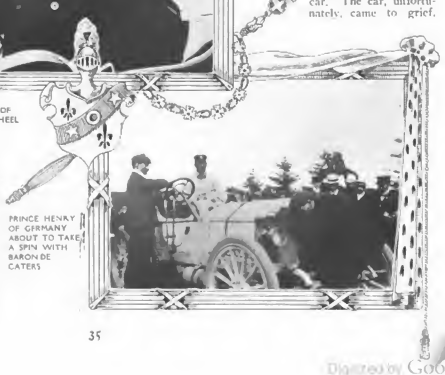
The Duke of Connaught also loves his "iron horse" and performs many of his military duties in his car, and his son, Prince Arthur, of Connaught, is an enthusiast. Queen Alexandra will have a gasoline car next year, and both the Prince and Princess of Wales are much interested in motoring. Princess Henry of Battenberg is in her motor car many hours a day, and always pays her round of official visits on the Isle of Wight in it. The Princess Christian has a motor car of her own which is often seen on the road. The car designed for her is British-built throughout and is of the type known as the double landaulet—a completely enclosed body (with the royal colors, blue with white lines), in the front of which the driver's seat is set. Large windows at the sides and front give ample light, and the driver is protected by a canopy and a glass screen.

There are, however, but two reigning monarchs who drive their own cars regularly—King Victor Emanuel, of Italy, and the King of Spain. King Alfonso, it may be remembered, nearly caused a cabinet crisis in his eagerness to possess a motor car, and now, having gained his desire, he has taken up the sport so enthusiastically that he is quite expert in the mechanical matters, is, in fact, a skilled *mecanicien*. He has already won a reputation as a daring and reckless driver. Not long ago, he ran his machine at breakneck speed into an electric street car, the driver of which was prosecuted, but the Mayor of Madrid took a hand in the affair and pointed out that the king was the real offender, that he paid no license, carried no tag, and, besides, drove habitually at high speed. The last charge was, however, judicially declared not excessive. It seems that King Alfonso's subjects are inclined to regard his passion for motoring as well as hunting and other outdoor activities, as a satisfactory proof of a sound constitution. A few years ago there was some anxiety on this account, but now, when the citizens of Madrid (with the exception of the Mayor) see the King's motor car flying round corners, they rejoice in his high spirits, and prophesy a long and prosperous reign. This loyal disregard of their own personal safety shows that the Spaniards are still a conservative people.

King Alfonso's mother, the Queen Regent of Spain, has always been an up-to-date woman, and has at all times shown a desire to keep abreast with the times. Her most recent hobby is the motor car, and quite recently her fondness for this mode of transit caused Her Majesty a considerable amount of discomfort. During the hottest months of the summer, the Queen elected to stay in a little village among the hills, about fifty miles from Madrid, and nothing would do but that the journey thither should be made in her motor car. The car, unfortunately, came to grief,



KING EDWARD VII OF ENGLAND AT THE WHEEL



PRINCE HENRY OF GERMANY ABOUT TO TAKE A SPIN WITH BARON DE CATERS

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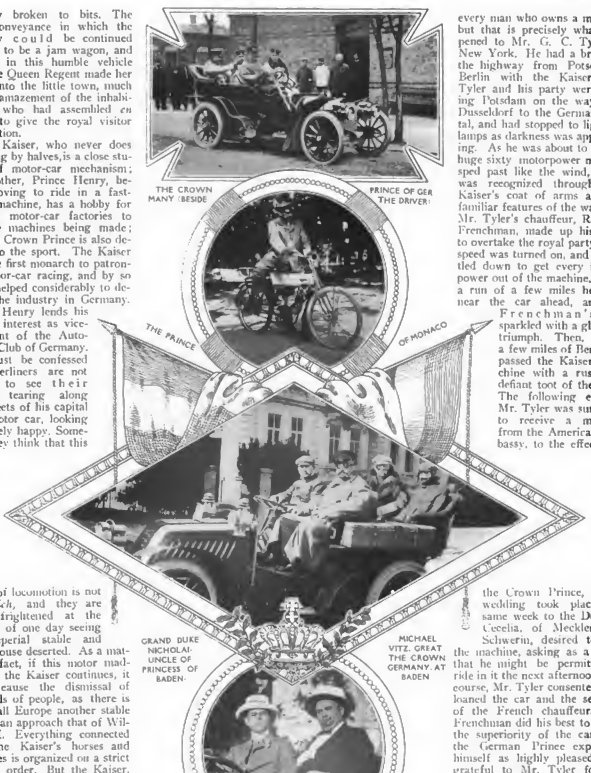
literally broken to bits. The only conveyance in which the journey could be continued proved to be a jam wagon, and it was in this humble vehicle that the Queen Regent made her entry into the little town, much to the amazement of the inhabitants, who had assembled *en masse* to give the royal visitor an ovation.

The Kaiser, who never does anything by halves, is a close student of motor-car mechanism; his brother, Prince Henry, besides loving to ride in a fast-going machine, has a hobby for visiting motor-car factories to see the machines being made; and the Crown Prince is also devoted to the sport. The Kaiser was the first monarch to patronize motor-car racing, and by so doing helped considerably to develop the industry in Germany. Prince Henry lends his helpful interest as vice-president of the Automobile Club of Germany.

It must be confessed that Berliners are not pleased to see their Kaiser tearing along the streets of his capital in a motor car, looking supremely happy. Somehow they think that this means of locomotion is not *Kaiserlich*, and they are also frightened at the thought of one day seeing the imperial stable and coach house deserted. As a matter of fact, if this motor madness of the Kaiser continues, it might cause the dismissal of hundreds of people, as there is not in all Europe another stable which can approach that of Wilhelm II. Everything connected with the Kaiser's horses and carriages is organized on a strict military order. But the Kaiser, however, becomes more and more interested in his cars. Until recently he only interested himself in the motor car for military purposes; now he has a splendid phaeton which he uses often with a couple of adjustants and his chauffeur. The imperial chauffeurs, by the way, are the highest salaried in the world, and they are non-commissioned officers of the engineer corps, skilled mechanics, and total abstainers. The Kaiserin does not like motoring any more than she does cycling, but her sons, one and all, are fond of both. Princess Henry shares her husband's love of the sport, and has a car of her own, although she does not go on long tours as he does.

Motor-car racing with an emperor does not fall to the lot of every man who owns a machine, but that is precisely what happened to Mr. G. C. Tyler, of New York. He had a brush on the highway from Potsdam to Berlin with the Kaiser. Mr. Tyler and his party were leaving Potsdam on the way from Dusseldorf to the German capital, and had stopped to light the lamps as darkness was approaching. As he was about to start, a huge sixty motorpower machine sped past like the wind, which was recognized through the Kaiser's coat of arms and the familiar features of the war lord. Mr. Tyler's chauffeur, Raoul, a Frenchman, made up his mind to overtake the royal party. Full speed was turned on, and he settled down to get every iota of power out of the machine. After a run of a few miles he drew near the car ahead, and the Frenchman's eyes sparkled with a gleam of triumph. Then, within a few miles of Berlin, he passed the Kaiser's machine with a rush and defiant toot of the horn. The following evening Mr. Tyler was surprised to receive a message from the American Embassy, to the effect that the Crown Prince, whose wedding took place the same week to the Duchess Cecelia, of Mecklenberg-Schwerin, desired to try the machine, asking as a favor that he might be permitted to ride in it the next afternoon. Of course, Mr. Tyler consented, and loaned the car and the services of the French chauffeur. The Frenchman did his best to prove the superiority of the car, and the German Prince expressed himself as highly pleased, and grateful to Mr. Tyler for the courtesy.

On a recent journey from Hanover to Hamburg, a stretch of about 120 miles, the Kaiser negotiated the distance in about three and a half hours. Owing to the rain he had intended to travel in the royal train, but the weather becoming fine, he expressed his intention of making the journey by motor car, in order to enjoy the beauties of the country. In the forest, the royal train, which had left Hanover after the Kaiser, came in sight. His majesty immediately gave orders to his chauffeur to quicken speed, and the motor car, a Mercedes, dashed forward at the rate of about sixty miles an hour. The Kaiser enjoyed the sensation immensely, and was anxious to race the royal

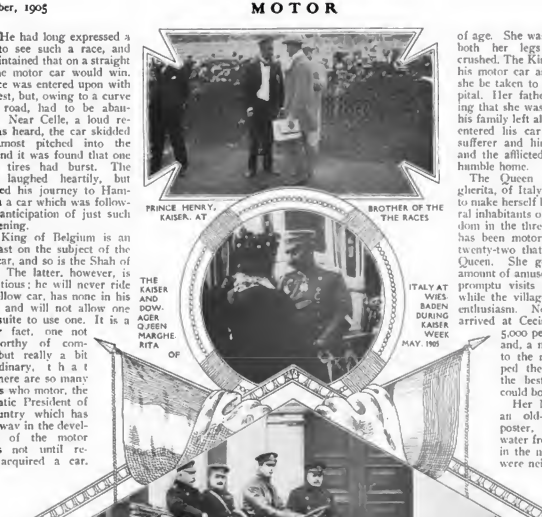


GRAND DUKE CYRIL, COUSIN OF THE CZAR, AT MUNICH DURING THE MOTOR-CAR RACES

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train. He had long expressed a desire to see such a race, and had maintained that on a straight road the motor car would win. The race was entered upon with great zest, but, owing to a curve of the road, had to be abandoned. Near Celle, a loud report was heard, the car skidded and almost pitched into the ditch, and it was found that one of the tires had burst. The Kaiser laughed heartily, but continued his journey to Hamburg on a car which was following in anticipation of just such a happening.

The King of Belgium is an enthusiast on the subject of the motor car, and so is the Shah of Persia. The latter, however, is superstitious; he will never ride on a yellow car, has none in his garage, and will not allow one of his suite to use one. It is a singular fact, one not only worthy of comment, but really a bit extraordinary, that while there are so many royalties who motor, the democratic President of the country which has led the way in the development of the motor car has not until recently acquired a car.



KING ALFONSO, OF SPAIN, GETTING READY FOR A SPIN IN HIS CAR

President Loubet did not stand alone among heads of governments as a "non-motorist"—President Roosevelt has not yet been enticed into the "sport of the twentieth century."

King Victor Emanuel rarely passes a day without calling for his car, but he uses it for a purpose, not merely for pleasure. Sometimes it is to hasten to some military manœuvres, at others to pay an early visit to some garrison town and call out the guard. Immediately upon hearing of the recent terrible earthquake in Calebria, the King ordered his motor car and hastened to visit the devastated districts, where he directed the work of the relief parties. He attended all the meetings of the relief parties, taking an active part in all the deliberations. While King Victor Emanuel was lunching at Monteleone in the stricken districts, there occurred a slight earthquake shock which created a panic and completely wrecked the railroad station. The King jumped into his motor car, proceeded to the ruins of the station and personally calmed the excitement of awe-stricken villagers. At Zomara, while he was watching the clearing away of debris, some workers came upon an unconscious child, about four years of age. She was still living, but both her legs were terribly crushed. The King lifted her into his motor car and directed that she be taken to the nearest hospital. Her father declined, saying that she was the only one of his family left alive; so the King entered his car with the little sufferer and himself drove her and the afflicted father to their humble home.

The Queen Dowager Margherita, of Italy, has done more to make herself known to the rural inhabitants of her son's kingdom in the three years that she has been motoring than in the twenty-two that she reigned as Queen. She gets an immense amount of amusement out of impromptu visits to small towns, while the villages go wild with enthusiasm. Not long ago she arrived at Cecina, a village of 5,000 people, near Pisa, and, a mishap occurring to the motor, she stopped there the night at the best inn the place could boast of.

Her Majesty slept in an old-fashioned four-poster, and found the water frozen in her room in the morning. There were neither carpets nor rugs, but lots of good will, and when she appeared at breakfast she remarked to the delighted landlady, who was serving, that the delicious odor of the lavender-scented sheets was still with her. The parish priest had had a little more warning, so that when the Queen appeared in the church for morning mass, he was ready for her in freshly starched vestments, while the faces of his acolytes were shining after a free application of soap and water. He was nervous, and almost dropped the collection plate when he saw that it contained gold.

Like other members of the British royal family, the Duke and Duchess of Fife, King Edward's daughter, and the Ladies Duff are motorists and enthusiasts, but in the early days of bicycles they were also devoted to that form of sport. When first they bought their machines, a man was sent down from a London riding school to give the Duchess and her daughters lessons, and, not being accustomed to the horse, held her rather gingerly. The Duke, who was watching, called out to him after a while, "Hold her tighter, man; never mind her royalty; keep good hold of her. Even royalty gets hurt if it falls."

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TABLE OF RESULTS OF THE VANDERBILT RACE

		Time of Start	First Round		Second Round		Third Round		Fourth Round		Fifth Round		Sixth Round		Seventh Rou'd		Eighth Round		Ninth Round		Tenth Round		
			Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Elapsed Time	Position in Race	Total Time
			H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.		H. M. S.
18.	Hemery (80 m.p. Darracq) .	6.17	28.23	14	26.01	6	25.56	3	38.18	8	24.49	6	25.28	3	25.25	3	25.39	1	28.34	1	27.35	1	4.36.08
14.	Heath (120 m.p. Panhard) .	6.13	28.02	11	27.01	8	26.53	4	26.55	2	26.30	2	26.33	2	29.05	2	33.32	2	27.10	2	27.59	2	4.39.40
7.	Tracy (90 m.p. Locomobile) .	6.06	28.14	12	28.37	12	28.36	10	32.11	7	27 40	7	32.53	5	27 53	5	30.52	5	31.57	4	29.33	3	4.58.26
4.	Lancia (120 m.p. FIAT) . .	6.03	23.49	1	23.31	1	23.25	1	23.18	1	28.02	1	23.45	1	24.02	1	1.11.17	6	23.51	3	35.31	4	5.00.31
10.	Szisz (90 m.p. Renault) . . .	6.09	24.55	3	24.29⅕	2	25.21	2	38.42	5	29.18	5	33.24	4	28.37	4	28.55	4	40.26	5	Running when race was stopped		
8.	Nazzaro (120 m.p. FIAT) . .	6.07	25.28	5	53.14	15	25.35	13	24.35	11	29.04	10	26.07	8	24.37	6	24.40	3	Running when race was stopped				
20.	Sartori (90 m.p. FIAT) . . .	6.19	27.41 9–10		27.30	10	27.09	7	27.33	3	31.13	4	41.32	7	53.49	8	37.43	7	Running when race was stopped				
9.	Warden (120 m.p. Mercedes) .	6.08	27.41 9–10		27.26	9	27.23	8	27.15	4	36.01	8	39.33	9	1.05.59	9	40.05	8	Running when race was stopped				
2.	Duray (130 m.p. DeDietrich) .	6.01	26.26	7	29.51	11	25.40	5	45.46	10	25.29	9	26.15	6	36.28	7	Running when race was stopped						
16.	Chevrolet (120 m.p. FIAT) .	6.15	28.42	15	28.15	13	31.35	11	38.53	9	31.16	11	30 44	10	Broke axle								
5.	Keene (120 m.p. Mercedes) .	6.04	27.21	8	27.03⅖	7	28.41	9	31.05	6	26.23	3	Wheels smashed in collision with telephone pole										
3.	Dingley (50 m.p. Pope-Toledo)	6.02	29.44	17	31.11	14	2.41.38	17	39.02	14	35.45	12	Running when race was stopped										
19.	White (40 m.p. White Steamer)	6.18	51.31	18	44.52	17	42.31	14	50.20	12	Running when race was stopped												
15.	Lytle (90 m.p. Pope-Toledo) .	6.14	29.15	16	1.31.02	18	35.32	15	40.03	13	Bent steering gear												
1.	Jenatzy (120 m.p. Mercedes) .	6.00	24.52	2	24.33	3	32.41	6	Cracked a cylinder														
6.	Wagner (80 m.p. Darracq) . .	6.05	24.56	4	24.53	4	40.49	12	Tire and engine trouble														
11.	Christie (60 m.p. Christie) .	*6.10	58.08	19	30.12	16	1.16.10	16	Wheel smashed in collision with Lancia														
12.	Cedrino (90 m.p. FIAT) . .	6.11	25.36	6	28.18	5	Crashed into pole at Lakeville																
X.	Campbell (120 m.p. Mercedes)	6.12	28.21	13	Broke gasoline tank.																		

* *Actual time of starting 6.38.*

AN ANALYSIS OF THE TABLE OF RESULTS.

It may be time that stories of great events should be told in the early years of their history, but the story of the Vanderbilt road race cannot be told in that way. They deal with actual facts and figures, and, in the last analysis of such a great road race, while varied and fugitive impressions are readable, statistics, after all, are the permanent value in the history of the race.

Selecting the four finishers in the race and analyzing their times, give fairly accurate results without any guesswork entering into the conditions. Lancia, the modern Centaur, made four consecutive rounds of the course at an average speed of 23.22 miles per hour, and had his brief but glorious effort lasted throughout the whole ten laps, Lancia, America, and the Vanderbilt course would have had a world's road record to its credit. Szisz, the winner, was steadily consistent, and Lancia's collision with the Christie car was really what might be called a "moving accident" in more senses than one. Lancia's fastest round was the fourth, which he did in 23 minutes 18 seconds, an average speed of 23.18 miles per hour, or 386 miles per minute, showing that he was moving over the ground at the rate of 1068 feet per second. Lancia was the leader in the race in every lap up to the eighth round, when his collision with Christie ended his career at least forty to fifty minutes' delay.

Hemery, the winner, won only by three minutes and thirty-two seconds, his average speed per hour being 61.49 miles, his fifth round being covered in 24.49, which would indicate that his rate of speed after all was his consistent performance round by round, the greatest variation in any of his rounds being 3 minutes and 29 seconds. On the 2d lap, 6th; third lap, 3d; fourth lap, 8th; 5th lap, 6th; 7th lap, 3d; 8th lap, 3d; 9th lap, 1st; 10th lap, 1st.

Heath's average speed per hour was 60.72 miles, and his fastest lap was done in 26 minutes and 30 seconds, which at an average speed per hour of 67.92 miles per hour was 5650, his fastest lap being the fifth, which he circled in 27.40, indicating a rate of speed of 61.38 miles, but the greatest variation in his rounds was 5 minutes.

A look at the table reveals the startling fact that at the end of the sixth round Lancia was 26 minutes and 4 seconds ahead of the second man, more than a full lap. Notable also was Lancia's celerity in the work lap by lap, because Foxhall P. Keene, although he figures in the table as "also ran," was third when he hit the telephone pole at the "S" turn on his sixth lap, and his fastest 6.36 miles was made at the rate of 56.496 miles per hour.

The saddest feature of the table, after all, is the fact that the drafted or substituted cars in the American team were all *hors de combat* long before the race was half finished, that the Locomobile was the first disabled, that the Pope-Toledo was the second, that the Panhard was the third, and that the Mercedes was the fourth to be put out of the race. "If I was so soon to be done for, I wonder what I was begun for."

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The Race for the Vanderbilt Cup

BY HERBERT EVERETT



TO the victor belongs the spoils; to Hemery, whose wonderful driving of a marvelous piece of mechanism, the cup, the cornucopia of much profit to driver and manufacturer alike. But to Lancia, the mad daredevil, goes the glory. To the wonderful monster of Italy goes that which no one can gainsay.

How many thousand people witnessed the derby of American motoring, it is hard to say; indeed, difficult even to make the wildest kind of an estimate. Approximately fifteen hundred motor cars, though no doubt there were far more than that at the race, crossed the several ferries leading to Long Island in the blackness of the early morning on October 14; from the little runabout, with its hoarse chug-chug, to the whir of the big sixty motor-power monster, all classes of motor cars were represented—even the motor truck, for in one of these a party of jovial pleasure-seekers were seen wending their way along Hoffman Boulevard long before dawn had glimpsed over the eastern horizon. And those who traveled to the cup course by train (and suffered comparison with the proverbial sardine) seemed to be myriad. All motordom seemed to have turned loose before four o'clock in the morning. The wild scramble for seats (or, rather, standing room) in the train of twenty cars was a surprise not only to the railroad officials—which surprise seems to have taken away any vestige of managerial competence—but also to the motoring world at large. The overladen locomotives could but struggle manfully—and get stuck occasionally.



The Victor



Who Finished Second



Got Third Place



Fourth, but not defeated

Hours before dawn the vicinity of the grandstand was a seething caldron of activity. Motor cars, their great eyes staring hypnotically at the crowds that, all too careless of personal safety, thronged the roadway, the confusion of many tongues, both of sound and nationality, the tooting of horns, the screeching of sirens, and the occasional warning cry of a chauffeur—all these made up a scene of feverish motordom, until gradually order began to assume its command, with the appearance of the officials. Then the cry went up, "Here comes one," and the thunder of one of the racing monsters sent the crowd in the roadway scrambling right and left for safety. One by one the thunderers drew up, until the nervous tension of the crowd began to give vent in,



THE MAN WHO STARTED THE WHOLE THING

FINALE



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GEORGE HEATH (PANHARD) GOING DOWN THE THREE-MILE STRETCH OF HYDE PARK ROAD

after the fashion of American audiences, utter silence. Then the clerk-of-the-course drew Jenatzy to the line. Cheers! The short snaps of Starter Wagner's arm as he told off the seconds was the focus of ten thousand eyes; and Jenatzy heard "ten, nine, eight, seven, six, five, four, three, two, go"; in went the clutch, and, like a flash, the race was on.

Then came Duray, with his great De Dietrich, rumbling like distant thunder; then Dingley in the pigmy Pope-Toledo. Then came Lancia, the favorite, tense, eager, fiery, with all the fire of the south, awaiting the word "Go," and when he heard it, it seemed he had almost disappeared. And so they went one after one—Christie, No. 11, missing his start and being compelled to wait until all had made their adieus—until the officials, grouped in front of the grandstand, began to watch for the coming of the first car, when the French words, "qui vive," meant to the Anglo-Saxon mind all that it means to the French.



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DAREDEVIL LANCIA (FIAT) AT THE GUINEA WOODS TURN. TOOK CORNERS AT TOP SPEED WITH A SEEMINGLY RECKLESS DISREGARD FOR HIS NECK

Little can be said of Hemery and the Darracq. He was the victor and he deserved his victory. Nothing wonderful happened to him; his driving was consistent throughout, neither spectacular, nor particularly conservative. He was what one might call midway between Heath, the careful driver, and Lancia, the daring. This is the second consecutive victory in which he has maintained an average of considerably over a mile a minute. The Ardennes was his, a distance of 372.8 miles at an average speed of 62.34 miles an hour; and this last, 283 miles, at an average of 61½ miles an hour. This is almost ten miles an hour faster than Heath's time of last year over what was practically the same, or a similar course.

It was not until the sixth round that Hemery began to forge to the front, and then, not until Lancia had been eliminated from first place by an accident. He then had Heath to combat for first place, and it was a battle royal, which culminated at Guinea Woods. Hemery stopped for gasoline. Feverish, eager, trembling-fingered helpers poured the vital fluid into the tank. Then there was the cry, "Car coming." It was Heath, growing larger and larger every infinitesimal fraction of a second. The work of replenishing the tank not even completed, but quickly realizing that sufficient gasoline was there to carry him to the finish, Hemery bounded into his machine and started, his mechanic barely tumbling into his seat in time. In an instant the Darracq found her stride. But in the interim Heath had bounded up and the two were neck and neck—first one leading, then the other. They approached the Guinea Woods turn, the Darracq to the right of the road. Hemery waved his hand for Heath to give him the right of the road at the corner, but Heath knew well to give what was asked would be to give away the race. Neck and neck, they swung around the corner at full speed. Never was there such a turn made before. Hemery swung close to the inner edge of the road, almost overturning his car. Heath swung in a wider sweep toward the outer edge, throwing up pebbles and dirt in a tremendous skid. Then came a hill about 500 yards long—and for the result of this climb read the finish: Heath 36 seconds behind Hemery.

George Heath, the hero of last year's



TRACY (LOCOMOBILE) JUST BEFORE HE CROSSED THE FINISH LINE, WINNING THIRD POSITION

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Vanderbilt cup race, came nearly being the hero of this. Indeed, had he not been true blue, he would again have lifted the cup. When Foxhall Keene, who had been driving his Mercedes thunderer in a manner which brought him plaudits, and third place in the fifth round, and second place for part of the sixth round, met with his accident at the dangerous "S" turn, Heath lost at least four minutes, if not more, by stopping and inquiring if Keene were hurt and if anything could be done. It was indeed a generous act worthy of the man. On only this occasion had Heath stopped his engine during the entire race. From the fourth to the seventh round he was second in point of time to Lancia, and when Hemery displaced Lancia he seesawed with the former until the finish. Heath drove in his usual careful, intelligent manner, and that he did not win is not due to inability in himself or his car.



CHRISTIE, THE HOODOOED



KEENE (MERCEDES) IN A BRUSH WITH HEATH (FANHARD) JUST A SECOND BEFORE HIS ACCIDENT AT THE "S" TURN

A remarkably consistent performance of road driving and also of a machine was that of Tracy and the Locomobile. Tracy drove a careful, conservative race and maintained a consistent average speed throughout, the time for his rounds, from first to tenth, respectively, being, 28.14, 28.37, 28.36, 32.11, 27.40, 32.53, 27.53, 30.52, 31.57, 29.33, an average of 29.39⅘. A remarkable part of the performance of the car is its good work with a new pair of cylinders which had to be installed the night before the race. A remarkable fact, also, is that Tracy had no tire trouble whatever, the Diamond tires with which his car was equipped at the start remaining intact throughout the race. The only difficulty that Tracy had which prevented him from making faster time and possibly being the winner was the fact that he had to stop nearly every round to wipe off the clutch. During the entire race Tracy gradually improved his position, which in the order of rounds was as follows: twelfth, twelfth, tenth, seventh, seventh, fifth, fifth, fifth, fourth, third—showing the wonderfully consistent performance of the car and the man.



SZISZ (RENAULT), WHOSE CAR PROMISED MUCH, BUT—



LANCIA IN FRONT OF THE GRANDSTAND AFTER THE FINISH—DIRTY, DISAPPOINTED, BUT UNDEFEATED

Lancia, the disappointed! That describes it. He was not defeated; he was not crushed; simply disappointed. He knew, after the first round, that the race was his, barring accidents, and that he had confidence in the ability of his car and his ability as a driver was clearly demonstrated in his wild dare-devilry on the stretches and on the corners. It is a wonderful thing, indeed, that this FIAT car should have maintained its premier position for seven rounds at an average of 69.9 miles an hour for a total distance of 198.1 miles—an unheard-of feat before this. Had not this accident occurred, for which, in a measure, Lancia is blamable, the FIAT would have unquestionably "lifted" the cup by an easy margin; for, at the time of the smash-up, Lancia was 21 minutes and 7 seconds, or very nearly a whole round, ahead of Heath, his nearest rival. One thing, however, might be mentioned in regard to Lancia's misfortune: the policing of the course was, like last year, wholly inefficient and unsatisfactory; had the persons who crowded around Lancia's car at the edge of the road, when he was moving out into the course, been driven back out of the way, the accident would never have occurred. There is no doubt that Lancia, if he knew the car was coming (and there is every reason to believe he did), could not on account of the crowd see that the position of the platform would not permit him to drive his car from it into the side of the road to which he should go in order to allow Christie to pass. The result was that he had to go into the middle of the road; consequently, Christie smashed into the FIAT.



JENATZY (MERCEDES) WHO SAID HE WOULD BUT DIDN'T

In connection with the performance of this FIAT, it is well to mention that Nazzaro and Sartori are entitled to sixth and seventh places respectively, and were still in the running when the race was called off. Cedrino in a 90 FIAT came to grief by hitting a telegraph pole at Lakeville. Chevrolet in the other 120 FIAT broke an axle which put him out of the running in the sixth round.



WARDEN (MERCEDES) IN A NECK AND NECK SPRINT WITH DURAY (DE DIETRICH)

A strong factor in the race was Szisz in the Renault, who is entitled to fifth place, and was still running in the ninth round when the race was stopped. His difficulty, and the reason that he lost considerable time (and possibly the race; who can tell?) was a leak in the radiator, which required him to stop on nearly every round, to replenish with water. His terrific bursts of speed were possibly greater than that of any car with the exception of Lancia's. Indeed, his brush with Keene in front of the grandstand was a marvelous demonstration not only of his skill, but also of the tremendous speed of which the Renault is capable. Both cars were traveling at a terrific pace as they approached the grandstand, and the excitement of the spectators was at its highest pitch. Keene held the center of the road, until he saw that the Renault was creeping up upon him, when he gave way slightly to the right, just in time for him of the wonderful name to whiz past the Mercedes, in most dangerous proximity first to the crowds at the roadside, and then to the front of Keene's car.



DURAY (DE DIETRICH) WHO WAS UNFORTUNATE

The performances of the Mercedes cars were a decided disappointment; Warden's

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FOXHALL KEENE (MERCEDES) GOING AT LEAST 90 MILES AN HOUR

One thing in this race stands out—"tires." There was less tire trouble in this big event than in the last, and far less than is the average lot of any big road race. The reason to be ascribed for this good news is not that the road surface was any better than that of last year's course, but rather to improvement in the construction of tires. The remarkable manner in which the Diamond tires stood up under the heavy Locomobile is worthy of more than passing notice. The Michelins were, as usual, consistent, and also the Continentals on the Mercedes cars. The French Dunlop tires on the winning Darracq did remarkably well, as is shown by the result.



FOXHALL KEENE, WHO DROVE A PLUCKY, BUT UNLUCKY RACE

It is being said now that France will refuse to accept the cup, as the Automobile Club of France has decided to promote no more road races, because it considers that France, being so big in the motor-car industry, deserves a larger representation in every event than any other nation. Should the cup not be accepted by France it will be raced for in this country again, since Heath's Panhard is also French, leaving the third, an American, as the car was the only one of the German cars to remain in the race throughout. The second round eliminated Campbell with a leaky gasoline tank. The fourth round put Jenatzy out of the running with a cracked cylinder. The sixth round brought its pall of keen disappointment to Keene, when the latter crashed into the telegraph pole at the unlucky "S" turn. Warden was in the eighth lap when the race was called off. It was hardly expected that the last would remain throughout the entire distance, inasmuch as he had to replace two of the cylinders of his big Mercedes which had been cracked several days before the race. But Warden drove an excellent and consistent race and was always a factor to be reckoned with.



SARTORI, NO MORE "THE UNLUCKY"

The De Dietrich car was unfortunate. In the fourth round Duray lost fifteen minutes between Hyde Park and the finish, and again had trouble in the seventh round where he lost fully ten minutes. He had done so well abroad with his car that much was expected of him, and this car would undoubtedly have been a factor but for the unlucky delays.



SZISZ AT THE START AT 6.01 A.M. IN THE UNCANNY, BEETLE-LOOKING RENAULT



SARTORI (SMALL FIAT) SURPRISED HIMSELF AND HIS FRIENDS BY DRIVING A REMARKABLY FINE RACE

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possible defender. Whatever action France may take, there will positively be another road race in this country next year.

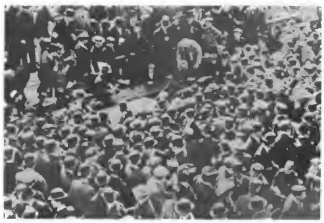
This event, the most important road race in the world, inasmuch as America is by far the most fruitful of motor car markets, was conducted in a manner far superior to that of last year—in fact, the arrangements were perfect in all but one particular, through the single weakness of which, however, the whole affair, like the last Ormond-Daytona meet, and for the same reason, might have failed miserably. The wholly inadequate, incompetent travesty on policing was a blot i' the 'scutcheon and Heath's words, while brutal and the result, no doubt, of anger and disappointment, were only too true. The writer suggested to an official before the race that perhaps the state authorities could be induced to call out a regiment, say, the "Seventh," and that the cost would not be greater than the need of nine hundred men to keep the crowds in order. France, Germany, Italy and England have supplied military police when necessary, and the needs was great enough on October 14. One instance where the special police (or whatever the cognomen of those individuals, who, clothed with a badge of authority, stood about like up-state hayseeds ignorant alike of races and crowds) failed signally was when, after Lancia had been stopped in front of the grandstand, Tracy in his big Locomobile, at a mile-a-minute gait, came down the home-stretch crowded with excited, thoughtless humanity. For a moment those who saw the situation held their breaths—and then came a frantic scramble for safety and the inane shouting and curses of the "special police." It was not due to the particular efficiency of these travesties on the "finest" that Tracy did not kill a few people—and himself. Another instance was when Szisz in the Renault had the brush with Keene in front of the grandstand; the distance between the machine and the bystanders was recklessly small. It is to be hoped that the officials of subsequent races will make the policing equal to the other arrangements this year.



NAZZARO, WHO WENT WHEN HIS TIRE TROUBLE KILLED HIS CHANCES



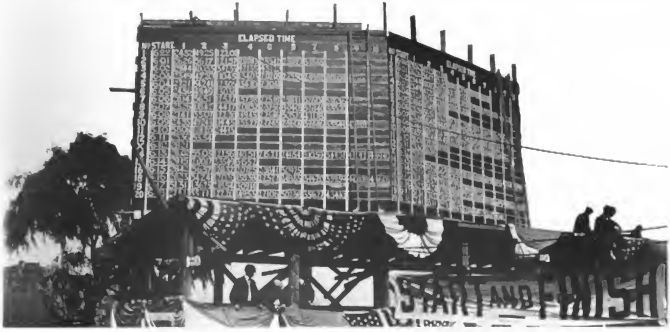
NAZZARO (FIAT) WAS EQUALLY DARING IN TAKING CORNERS AT HIGH SPEED AS HIS TEAM-MATE, LANCIA



LANCIA'S SYMPATHIZERS AROUND HIM JUST AFTER HE HAD FINISHED

It is to be regretted that an otherwise international road race did not bring forth British manufacturers. The Vanderbilt race has again demonstrated that the Latin peoples are still in advance of the Anglo-Saxon. Is it not time for the latter's slower-moving intellect to come to the front now—as he will eventually? At the present moment, and judging from results, France and Italy hold the palm. Every fact brings with it the question "Why?" Why is it that these two countries maintain the position they have won, in spite of the fact that in all other fields of industry the Anglo-Saxon makes them take a secondary position? An interesting discussion involving many points which might be of interest to motor car owner and manufacturer alike would be brought forth by a complete answer.

Apropos of road racing, there has been much heard suggesting touring car races as the best way, through racing, of furthering the interests of the industry. The excellent showing in the American eliminatory trials of stock touring car models lends the necessary weight to this suggestion to demand on the part of the promoters of these events serious consideration of it. Is it not true, after all, that the buying public is rapidly "getting wise" to the fact that the monstrosity of motorpower is not for use, and that the manufacturer is "tumbling" (particularly indicated in the new attitude of the Automobile Club of France in declining the Vanderbilt cup) to the fact that he is spending enormous sums of money with no commensurate return?



Copyright, by F. Ed. Spooner, 1905

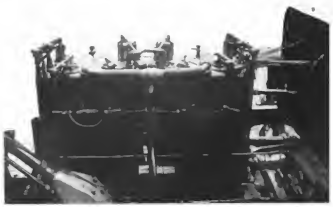
THE GIANT SCORE BOARD

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MECHANICAL DETAILS OF THE VANDERBILT CARS

By Alex Schwalbach

TO the student of the mechanics of a motor car the construction of the details of great racing cars are always interesting because they indicate the tendencies of the great constructors, and if the features that have been introduced produce the results that were anticipated for them, why they are sure to be reproduced during the following year in the touring cars made by the same makers.

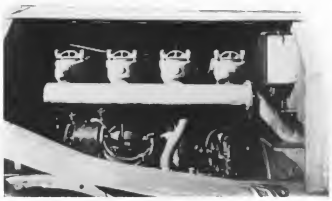


RIGHT HAND SIDE OF DARRACQ MOTOR



LEFT HAND SIDE OF DARRACQ MOTOR

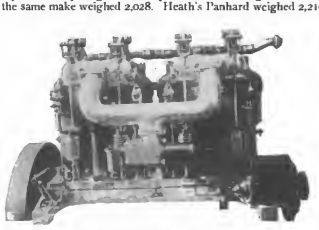
The mechanical briefs of the American competitors were given in detail in the October issue of MOTOR after the eliminatory trials; hence there is no need to repeat them. The technical committee of the A. A. A., who had charge of the weighing in of all the cars, through some culpable neglect failed to provide themselves with blanks to be filled out by the contestants such as they used in the American eliminatory trials. The committee therefore only took cognizance of the weights of the cars and referred all inquiries as to the mechanical details of the foreign cars to the official catalogue, which was, however, lacking in detail and wholly inaccurate, being evidently only a partial reprint of some of the statistics of the foreign cars which were published about the time of the Bennett race last summer. There was a considerable variation in weight among the foreign cars. Hemery's Darraeq weighed 2,060 pounds, while Wagner's car of the same make weighed 2,028. Heath's Panhard weighed 2,219 pounds, 15 pounds being allowed for its magneto, which is, however, not a fair allowance, as Chevrolet's Simms-Bosch magneto, when weighed separately on the scales, weighed 27½ pounds. Jenatzy's Mercedes weighed 2,221 pounds with a magneto, and Foxhall P. Keene's Mercedes with magneto removed, and groomed to a hair, tipped the scales at exactly 2,204 pounds, the maximum weight allowed. Warden's and Campbell's Mercedes weighed also the same. All of which shows how close the Daimler people build to weight.



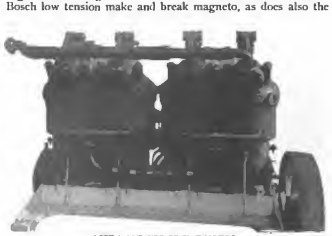
RIGHT HAND SIDE OF PANHARD MOTOR

Duray's big De Dietrich weighed 2,206 pounds with its magneto. Szisz's Renault weighed 2,202 pounds, magneto included. Lancia's fleet FIAT weighed 2,182 pounds without a magneto. Nazzaro's FIAT, without the magneto, weighed 2,180 pounds, Cedrino's FIAT also being the same weight, while the small FIAT that Chevrolet drove tipped the scales without a magneto at 2,204 pounds, and Sartori's FIAT weighed 2,192 pounds with a magneto.

The method of driving the cars was divided. The Darracqs, Renault and Panhard had shaft drives, while the FIAT, Mercedes and De Dietrich employed the double chain drive, the Panhard touring cars, however, being fitted with double chain drive. But the fitting of the racing car with a shaft drive may indicate a change in the future to a shaft drive of all of the Panhard product. All the foreign cars were fitted with magneto ignition, but divided as to make and type. For instance, the Darracq cars used a high tension magneto. The Mercedes cars used a Simms-Bosch low tension make and break magneto, as does also the De Dietrich racer. The FIAT racing cars are all fitted with a Simms-Bosch low tension make and break magneto, the Panhard having a high tension jump spark Eiseman magneto.



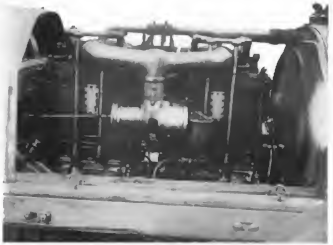
RIGHT HAND SIDE OF FIAT MOTOR



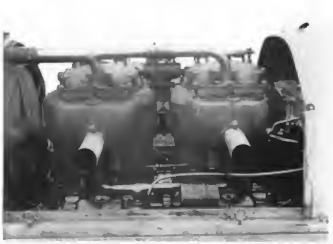
LEFT HAND SIDE OF FIAT MOTOR

The illustrations of the Mercedes motor show a most in-

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RIGHT HAND SIDE OF MERCEDES MOTOR



LEFT HAND SIDE OF MERCEDES MOTOR

genious method of cooling the motor when the car is driven at a low speed. It has been found that it is an impossibility to drive a very high powered racing car through our city streets within the legal limit without overheating, owing to the slow number of revolutions of the fan in the flywheel. On the Mercedes car the flywheel is in the usual place in the rear of the motor, but, as the illustrations show, an extra vane fan is provided in front of the motor and behind the radiator. This fan is driven by a belt off the main shaft and thrown into action by means of a wire rod which throws a weighted belt tightener on the belt which drives the fan. The fan, of course, is geared up very highly, much more so than the speed of the motor, and the result is the added facility to drive a big overpowered car through our city streets with the slow turning motor running not over 200 or 300 revolutions per minute.

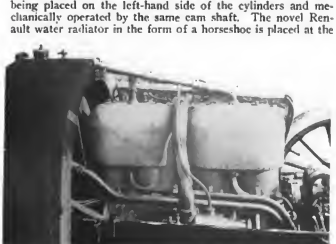
There was great difficulty with all foreign cars in taking out and replacing the magnetos, notwithstanding the gears were marked to match, but on the Locomobile, Constructor Riker has a magneto of the low tension make and break variety of his own design which is attached to its driving shaft by a simple clutch and which is arranged so that it is impossible to put it in wrong, which might disarrange the timing of the firing of the cylinders. The connecting clutch in the magneto is so constructed that it can only go together one way.

The biggest cylinders on all the racing cars were that on the Locomobile, which was 7½x7½ and those on the De Dietrich, which are 190x150 km., equivalent approximately to 7⅝x6 inches. On the Darracq car the cylinders are cast in pairs, 6x6, using a high tension jump spark magneto. The Panhard car had four steel cylinders, 6⅜x6½, cast separately, with copper water jackets and high tension Eiseman magneto. The clutch is their well-known multiple disk type, which transmits power to a gear box by propeller shafts and by rear axles.

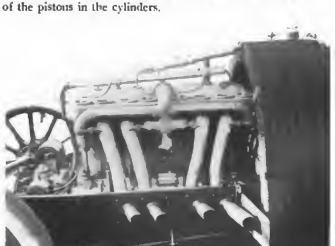
The big 130 motor power De Dietrich has four cylinders 190x150 mm., side chains taking the power from metal-to-metal clutches of large diameters to the driving wheels. The 80 m.p. Renault had cylinders of 150x160 mm., the cylinders were cast in pairs and were covered with superb specimens of hand-beaten copper water jackets, the inlet and exhaust valves all being placed on the left-hand side of the cylinders and mechanically operated by the same cam shaft. The novel Renault water radiator in the form of a horseshoe is placed at the back of the motor and is composed of two superposed layers of finned tubes. These two ranges of tubes do not connect with each other excepting in the lower part, but the upper part connects a little reservoir which an interior division divides into two wholly distinct compartments. The lower compartment is connected with a large water tank and the water flows from this tank to the pump which drives the water to the lower part of the cylinder water jackets. From the cylinder head the water goes to the upper compartment of a little water tank where under the influence of a pump water passes through the finned tubes.

The big FIAT cars had their four-cylinder vertical motors cast in pairs, the bore being a little more than 7 inches and the stroke a little less than 6 inches, the Simms-Bosch low tension magneto furnishing a make and break spark very similar to the Mercedes method. The carbureter has a piston which automatically uncovers auxiliary air ports at high speed. A pump forces the cooling water through a honey-comb radiator, the usual fan behind the latter being dispensed with, a fan-shaped flywheel being used to draw the air through the cooler.

The Mercedes cars had cylinders of 185x150 mm., a make and break low tension magneto being fitted, the arrangement being well shown in the illustrations. The water pump and the magneto are both driven from the same spur wheel on the exhaust valve cam shaft and are coupled together, using only one driving pinion. The pump, it is to be noticed, is very close to the water jacket, so as to avoid a leak between the pump and the water jacket. The inlet side of the motor shows the splendid method of throttling the carbureter, the throttle and carbureter being mounted very close to the inlet ports; in fact, are almost of one piece construction, and inserted directly into the connecting pipe of the two inlet ports. The system saves weight in piping and makes it possible to control the speed of the motor in a thorough manner because very little mixture, if any, is stored between the inlet port of the motor and throttle and the vaporizer, so that the slightest movement of the vaporizer must at once influence the speed of the motor. The whole layout of the motor is very compact, and the marvel of it all is that so slender a base should stand the five-ton lift of the pistons in the cylinders.



RIGHT HAND SIDE OF RENAULT MOTOR



LEFT HAND SIDE OF RENAULT MOTOR

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Perfect Condition *in a* Second Hand Car.

WHAT IT IS AND HOW TO GET IT.

BY HERBERT L. TOWLE

FOR SALE.—A 1904 Decapod, 24 H. P., King of Belgians body, Cape cart top, baskets, lamps, etc. *Car is in perfect condition.* X. Y. Z., care THE AUTOCARS.

THE italics are not always used, but the sense is the same. Somehow, if the advertisers' word is to be taken for it, the best cars seem always to be those offered for sale, and the disappointments and failures are allowed to slip into decent, unadvertised oblivion. No one ever tries to sell a poor car.

And yet, how many buyers will admit having discovered second-hand cars in what they would call "perfect condition"? And if for a few joyous days the cars they bought betrayed symptoms of the perfection claimed for them, how soon has a slipping clutch here, an uncertain lubricator there, a bracket loose on all its bolts, a ball bearing or differential suddenly gone to the bad, jarred them out of their brief felicity?

If we use the term in its strictest sense there is no such thing as "perfect condition" in a car that has been used. Perfection, not of design or construction—no one has attained that—but of condition, is found only in a perfectly new car, or rather, perhaps, in a car which has been tested out enough for the discovery and correction of small defects—and no more. If the car is cheaply built or badly used, it may cease to be in perfect condition in the first hundred miles. If of first-class design and build, and kept tuned up as regards battery, vibrators, and small wearing parts generally, it may not appreciably fall off in condition for weeks, even months, of reasonable use.

A car is never new but once, and no amount of overhauling will take all the wear out of a car one or two years old. There are too many bearings: they are too small, they are not bushed, or they are not worn enough to make renewal worth while. Then there are other sorts of wear than that the bearings are subject to. The brakes, the clutch, the gears, all wear out, and the multitudinous joints, connections, pins, *et cetera, ad inf.*, of the operating mechanism and the running gear, get loose, are hard to oil, and are seldom or never bushed. Important bolts, subject to shearing stresses, may be too small for their holes, so that they cannot be kept tight; rivets may partly shear; taper pins, keys, etc., may be too small for their work, so that they gradually work loose or shear; the valve cams may lose their timing through wear; the pumps may be defective or the radiator partly clogged—and so on down the lengthy list.

Some of these things indicate faultly design or wrong materials, and they do not happen to good cars, at least till they have seen long service. None of them necessarily indicates abuse, though the harder a car is driven the sooner they will appear.

If a car is carefully used, and is of first-class make and not too high power, it may last four, six, or eight years before it finally has to be discarded. But what has been said will show why a motor car has too many ways of wearing out to figure as the equivalent of a new machine after it has seen a season's use.

The truth is that the average seller uses the phrase "perfect condition" in one sense, and the average buyer in another, and neither buyer nor seller is entirely reasonable. To the owner, if he is not sophisticating, the phrase generally means that his car is in as good order as could be expected considering the mileage it has done, that it is ready to run or can easily be made so, and that it has suffered no vital injury necessitating costly repairs.

To the buyer, on the other hand, at least if he is a novice, "perfect condition" is apt to mean brand-new condition—a condition which, as already remarked, is seldom found save in brand-new cars, and never in cars which have seen a season's use. After a man has used his car for a season, his construction of the phrase is much more liberal; and if, as is quite possible, he wishes to dispose of his own car, he is very likely to surrender his early "principles" outright.

Between these two interpretations there is a self-evident and notable gulf; and the divergency is helped by the fact, often forgotten, that whereas the owner is familiar with his own car, and knows where to look for trouble, and how best to remedy it, how to humor the weaknesses of his machine and how to get the best out of it, the buyer on the contrary, in all likelihood knows less than nothing on any of these heads, and, unlike the first owner, is compelled to learn them all at once, instead of point by point as the effects of wear begin to show themselves.

A car may in fact be, to the practised hand of its first owner, in "perfect condition"; and the buyer, even if admitted to all the mysteries of roadside *pannes* and garage repairs, might not be disposed to carp at it as giving more trouble than it ought. In short, it will require time to keep it in tune, but if the owner knows his business it will give very little trouble, properly so called. But let the same buyer get the same car, after a reasonable demonstration and inspection, but without the full initiation aforesaid, and before he has learned the whims

(Continued on page 82)



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Correct Motor Raiment

By Joel Feder

NOVELTIES IN FASHIONS *and* FANCIES *for the* MOTORIST

The Practical and the Picturesque—Fashions that are Both Comfortable and Sightly—Quaint Looking Hoods of Fur and Furry Stuffs—Fur Lined Coats of Stout Materials—Gauntleted Gloves and Fur-Lined Carriage Boots—The Waning Vogue of Leather and the Rise of Textile Toggery

EVERY sport brings its fads in fashions—garments that are supposed to be especially suited to it.

It really seems as though Dame Fashion were ever on the alert for still further opportunity to increase the wardrobe belongings of her devotees. What with the very rigid lines that are drawn in the distinctions between one class of costume and another; between what may be worn for carriage and for motor car, it takes a keen instinct for fashion and an alert sense of the eternal fitness of things to avoid what one clever *mondaine* designates "sartorial solecisms," which term seems charmingly descriptive.



From Saks & Company
A MODISH FUR-LINED RAGLAN

It takes quite some time and still more experience for the modes that are invented to meet special requirements to settle and simmer down to what shall be at once practical and picturesque. The day when the fair motorist feels bound to make an unsightly figure of herself merely because she was about to take a trip—be it long or short—in a motor car are past and done with; and for this we should render due thanks. Strangely enough, it was the French who were responsible for those atrocities in the way of shapeless and heavy garments, hideous goggles, and headgear that would defy the efforts of the cleverest to make becoming even in the least degree.

It is universally conceded that the American motorist—man and woman alike—is by far the best clad, from the viewpoint of fashion, appearance, and comfort combined. All of the prevailing points of fashion are incorporated in the feminine attire, with comfort and



THE ENTIRE COSTUME IN LEATHER. TAILOR MADE

practicability as the foundation upon which they are built. But, nevertheless, the fashions in motor raiment change just as frequently, and are just as fickle as they are in all the other departments of the wardrobe. One season it is waterproofed garments, flannel lined; and the next sees the rise of furs and furry textiles. At the beginning it was leather, and nothing but leather was supposed to be at all modish. This was the French fad, and one that they still cling to tenaciously over there. But the fact that leather is totally lacking in suppleness, that it is heavy in wear without at all according a due degree of warmth and comfort, and that, on alighting from the motor car the woman in leather raiment is slightly conspicuous—to phrase it mildly—in any gathering, are among the reasons that the average American motor car devotee looks upon leather with no very enthusiastic glance.



THE MODE IN LEATHER



From Saks & Company
COMFORTABLE COAT WITH BEAVER COLLAR AND ASTRAKHAN LINING

Some of the most charming fea-

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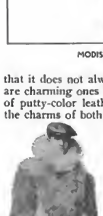
tures of current fashions are already prepared for the winter motorist. There are coats still prepared in leathers for those who indulge in long tours; but it is a leather totally different from what the best dealers displayed even a few short months ago. The new leathers partake of the soft and supple finish that marks so many textile fabrics; and their hues are just as many as Dame Fashion displays upon the color card of the new season.

The Empire coat is already a marked favorite in all sorts of fabric; but in the new leathers it takes to itself a distinction



MODISH COAT AND MUFF IN PERSIANA

that it does not always possess in other developments. There are charming ones in vivid scarlet, with bandings and pipings of putty-color leather, a combination that serves to show up the charms of both colorings to perfection. The many shades of mandarin, burnt orange, *coq des roches*, and others of the brilliant yellows that are so modish when applied in sparse and sparing touches upon gowns, are lavishly employed for smart motor coats. But where the leather color is inclined not to prove extremely becoming to the wearer, a fur collar is frequently interposed between the coat and the face, to the betterment of both, be it confessed.



From Schoffman Fur and Leather Co.
RUSSIAN GOATSKIN OVERCOAT

There are still some enthusiasts who cling to the leather costume of coat and skirt for all motor occasions; and even include a leather cap as a part of the outfit. But those are really the exception rather than the rule; and so comparatively small is their proportion to the mass of motorists that they hardly count in the ultimate summing up of motor fashions.

Imported coats in heavy tweeds are among the smartest things in the motor garment showings. To be sure these in themselves can scarcely be counted warm enough for driving in extreme weather. But this counts little since they are built to be slipped over any snugger coat Miladi chooses to wear. The best of these cloth coats are imported and are made of exactly the same fabrics, double-faced, as the men's motor coats. One such, just through the customs, was a very dark green, showing the faintest suggestion of a red-purple in its plaid. The cloth had a surface like finest suede and was quite an eighth of an inch in thickness. The garment was cut on full spreading lines, the back seam bias to give



THAT COMFORTABLE MOTOR HOOD
From Scandinavian Fur and Leather Co.

A VISORED HOOD IN SIBERIAN SQUIRREL
From Scandinavian Fur and Leather Co.

the circular sweep, and a broad, shallow hood almost covering the shoulders and back to the waist line.

The hoods on the motor coats, by-the-way, differ from those on other garments, because here they are really intended for service, and may be drawn up over the hat and veil as the wearer chooses. The hood linings are of plain satin.

As the season advances the fur cap will take precedence over any other form of headwear for the feminine motor devotee. Whatever fur appears in her coat or its trimmings she



From Revillon Freres
LUXURIOUS SQUIRREL LINED ULSTER WITH LYNX SHAWL COLLAR

will choose for her headwear. The visored caps are built along slightly new lines, so that the peak when turned back has almost the effect of a smart Colonial. As this peak appears front and back the cap is quite an attractive bit of headwear when the flaps are fastened in place on the crown.

Furs and fur-lined garments are presented in such profusion that the difficulty will be to make a choice from among the *embarras des riches* presented. There is

(Continued on page 120.)

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How to Remove and Replace a Tire

By Jay A. Nedarb

STOP the car! the sooner the better. The importance of immediate attention to this first item in the lesson of removing and putting on of a tire at the roadside has been overlooked many times to the owner's cost. A "flat" tire cannot be too quickly discovered and the injury repaired. Inner tubes are easily damaged and the cutting of the shoe or casing by the rim may quickly put the tire beyond repair.

So, stop the car; jack up the unlucky wheel and look for the cause of the injury. This is usually not hard to find, but it should be located without fail. Unless it be removed there is little to be gained by inserting a sound tube. Surprisingly often an imbedded nail or piece of glass is allowed to remain in the rubber and the tire is down again in less time than the repair has consumed. Of course, the cause of the puncture may be far back on the road somewhere, but an any rate search the casing both inside and out.

Most drivers prefer to insert a sound tube when making a roadside tire repair, leaving the injured air chamber to receive attention at a more convenient place and time. The operation of taking the tire entirely off the wheel, in this case, is proceeded with as follows:

Remove dust cap, nut and washers from the valve stem and note where you put them. The importance of this latter simple reminder will be most appreciated by those of most experience. If the tire is not entirely deflated complete the deflation by opening the valve. Unscrew the staybolt nuts until they are nearly to the point of coming off, and then, starting at any convenient point, press a staybolt up into the tire to release the bead or clinch at that particular place. With one hand press hard against the tire and with the other force a small lever beneath the edge or bead where it is thus freed from the rim. By prying the bead up a second lever can be introduced and one side of the tire can then readily be pried out of the rim. Care should be taken to release the bead or clinch from beneath the staybolts as this operation is proceeded with, also to guard against damage to the air tube by rough handling of the levers.

With one side of the tire now free, push the valve stem of the tube up through the rim into the interior of the tire. With levers introduced as before beneath the edge of the tire nearest the car, the casing and the tube within it are soon laid on the ground.

Some operators recommend the removal of the staybolts entirely from the wheel before taking off the tire completely, but this is hardly necessary, as the bolts should be fastened loosely in the rim preparatory to putting the tire on again. Another form of practice often recommended is the withdrawing of the inner tube from the tire when only the outer edge of the casing has been released from within the rim. This is done by putting both hands under the free edge of the tire and so withdrawing the tube from beneath it. In case the tube is to be mended at once instead of the putting in of a fresh one, this plan is a very good one, especially as only that portion of the tube which contains the spot to be patched need be taken out, so that when the repair is completed the air chamber is then readily returned to position again.

Assuming, however, that the casing has been taken entirely off with the tube still within it, remove the tube from the casing gently. If it sticks, don't jerk, but free it with your hands.

Before putting a fresh tube in the casing sprinkle the interior of the latter with powdered soapstone. It acts as a lubricant for rubber and assists the tube to adjust itself without creasing or twisting. Do not fail also to inflate the tube partially before placing it in the casing—just enough so that it will round out normally, and not too much, or, for want of its usual retaining cover, it may burst.

With the fresh tube thus in place, hang the tire over the wheel and insert the valve stem in the hole designed for it in the rim. Push the stay-bolts up into the tire and with hands and levers force the bead at that side nearest the car into position in the rim.

In this connection here is another pointer often found worth while: If the tire is worn more on one side than the other, by nuts or other causes, improve the opportunity of having it off to change it about. Put on the outside the side which was nearest the car before.

Before prying the outer edge or head into the rim push the stay-bolts well up into the tire and see that they are not turned crosswise. This is an aid to prevent tube pinching by the assurance it gives that the tube is not caught at any point beneath the bead already in position. If the bolts move readily the tube is free and safe. If they do not, find out why. It will probably mean the detaching of the edge of the tire already in place at some point.

In prying the outer edge of the tire into position, every staybolt should again be pushd up into the tire, as each one is reached separately in the course of the operation, making sure that the tube is not caught beneath either the bolts or the bead now being attached.

With the tire in place on the wheel, attach valve stem washer and nut and screw up the staybolts. Inflate the tire, and when it stands up

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very nearly round under a full load, which is proper riding pressure, screw the staybolts up very tight, put the dust cap on the valve stem and the task is done.

With a little practice the removal and putting on of a tire is by no means difficult. A new tire goes on much harder than an old one, however, because the rubber is stiffer.

The patching of an inner tube is a simple matter, too, if one does not make too great haste. If it has been necessary to wet the tube to locate the leak, the rubber should be thoroughly dried. Always keep all moisture from the interior of your tires. In roughening the surface to which the patch is to be applied to a tube, also, bear down. Many operators do not make the surfaces of the tube and the patch, which are to be joined, as rough as they should be. Others fail to let the cement become as dry and sticky as desirable before putting the patch in place. Failure in either of these directions is likely to result in a repair which will not long endure.

The object in roughening the patch and the vicinity of the tube where it was punctured is to facilitate adhesion; the roughening by sandpaper or emery cloth removes the sulphur bloom and the soapstone or French chalk and brings to the surface the pure gum rubber of which the tube is





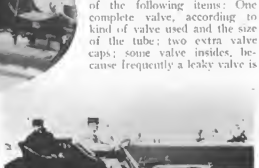


using not less than three or four coats on the tube and patch, letting each coat, however, dry before applying another, so that when both tube and patch have become in that condition that painters call varnish when it is set—tacky—the patch will stick closely to the tube without sliding about.

If possible, a roller cut from the end of a broomstick or the round end of a screwdriver handle should be used to compact the tube and patch closely together. After the patch has become firmly set dust the patch and surrounding surface of the tube well with powdered chalk or soapstone so as to prevent adhesion to the shoe. It is, of course, understood that the cemented patch is not a permanent repair, the heat of the traction having a tendency to loosen it so that when convenient the tube should be again removed and a vulcanized patch placed upon it.

A careful operator always carries one extra shoe or outside casing at least. A repair outfit for tire work should also be carried whether spare tubes are carried or not. A complete repair outfit should at least consist of the following items: One complete valve, according to kind of valve used and the size of the tube; two extra valve caps; some valve insides, because frequently a leaky valve is





made. The patch and the punctured spot may also be cleaned with gasoline should sandpaper or emery cloth not be at hand. Too much emphasis, however, cannot be laid upon the injunction that "the more haste the less speed" is an axiom in handpatching inner tubes.

It is well to apply the rubber solution very thinly and evenly,

the cause of trouble and it is so easy in a modern valve to unscrew the valve cap and insert its slotted upper portion into the valve, using it like a screwdriver to draw out the threaded valve inside. A new valve inside is readily inserted by the same method, reversed, but the valve inside should be always

(Continued on page 112)

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THE MAKE and BREAK SPARK

BY CHARLES E. DURYEA

THE self-propelled vehicle, one of the earliest mechanical conceptions, has proved itself by the length of time required for its development to be one of the severest problems yet attempted by mechanical engineers. Of the many minor problems involved, that of ignition is considered by experts as the most troublesome, and when the motor stops the usual thought of the operator is that there is trouble in the sparking system. Many forms of ignition have been used, and it so happens that the one in most common use now is also the oldest form. The Rhumkorff coil, which produces the jump spark, was employed by that able French pioneer, Lenoir, about 1860, both on gas engines and motor vehicles.

Most gas-engine experimenters, however, were not electricians, or, if they were, they preferred to avoid electrical ignition, on the principle that a gas engine should do everything by the use of gas, a theory, which, although apparently good, has not worked out to the greatest advantage in connection with the motor car. The earlier Otto engines ignited the charge by means of a gas jet on the outside and a traveling slide adapted to carry a little of the mixture while burning from the jet on the outside to the charge in the cylinder. This transference of the flame was not always reliable, cutting itself off and out at times, and it is really a wonder that experimenters, having no previous knowledge of the gas engine, could have such faith in its ultimate success as to continue with such a device until they had brought it into a successful form.

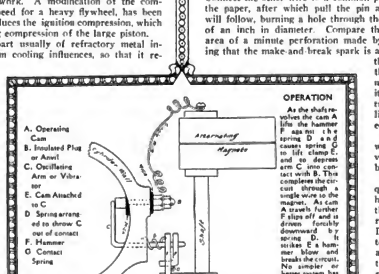
Still later, Daimler's idea, the use of a hot tube maintained at a red heat by a Bunsen burner or similar contrivance on the outside, was used for ignition. This tube, normally filled with burnt gas, would not ignite the new charge until the compression forced the unburnt mixture into the tube, and, therefore, the time of ignition could be regulated by heating only part of the length of the tube. This method, which is quite reliable for engines having a constant amount of compression and running at a fairly constant speed, was employed on motor cars, particularly in England, when they began to be built there.

There are a number of other methods of ignition which have been used to a limited extent. One of these takes advantage of the catalytic action of spongy or finely divided platinum in the presence of hydrogen. This effect is also made use of in some forms of self-lighting gas burners. For gas-engine service it is slow, more delicate and less reliable than the more common systems.

Ignition by compression is used in some stationary engines, particularly those of strong construction and fitted with heavy flywheels. If a cold explosive charge is compressed to five hundred pounds per square inch without allowing the charge to lose its heat to the cylinder wall, it will be heated sufficiently to ignite spontaneously, and as the walls get hotter, the required compression is much less, so that, after warming up, a compression pressure of less than one hundred pounds will occasionally produce spontaneous ignition. This fact is well known to motorists whose engines frequently "pound" on a long, hard pull, because of premature spontaneous ignition. Like the hot-tube ignition, this method is only adapted to steady and preferably slow work. A modification of the compression method, to avoid the need for a heavy flywheel, has been tried, in which a small piston produces the ignition compression, which is much higher than the working compression of the large piston.

Another method provides a part usually of refractory metal inside the cylinder and away from cooling influences, so that it remains at a red heat and serves to ignite the charge, much as does the hot tube.

Still another method employs a short platinum wire kept incandescent by a current of electricity. These incandescent methods are so liable to cause premature ignition that they are frequently used in connection with a timing valve, which does not permit the gas to have access to the igniting device until ignition is desired. This valve, however, is an added complication and equally as objectionable as make-and-break sparker parts used in connection with a common electric circuit. Within the last two years there have been several attempts to secure the large spark produced by the low-tension current of the make-and-break system without moving parts within the cylinder, which is one of the claimed advantages of the jump spark. This attempt has resulted in several magnetic devices in which the current that produces the spark also actuates the make-and-break mechanism, which is complete in the spark plug itself. Some of these are very ingenious and are worthy of description.



MAKE AND BREAK SPARK MECHANISM

One of the latest of these, the New-Dur exploder, is shown herewith and consists of a circular magnet of the iron-clad type, having an armature pivoted to one end, which armature is lifted by a spring and depressed by the pull of the current passing through the magnet coil. This depression brings the sparking-pin into contact, closing the electric circuit through the spark coil. At the proper time the commutator breaks the circuit through the magnet, releasing the armature, which, under the action of the spring, flies upward, knocking the pin out of contact and producing a hot, make-and-break spark at the point of the pin within the explosion chamber.

A number of devices have been used in which the electric circuit through the magnet coil attracts an armature, which breaks the circuit just as does the core of the jump spark coil, but, with these devices, a weak current will not operate the armature, and a strong current operates so quickly that the spark coil is not fully saturated, so that a weak spark is produced. The New-Dur exploder obviates these objections.

The most popular of the earlier German and French vehicles used the jump spark, and the success of the small tricycles equipped with a light, high-speed engine, brought this method into favor on both sides of the water. In America, stationary and launch engines were largely equipped with make-and-break spark, the same as is used for domestic gas lighting. On this account the earlier American motor cars were fitted with this system, to a much larger degree than were the foreign ones. These two systems are the only ones largely surviving in use on motor cars, and therefore the only ones that need be considered as practical in this article. It is supposed by many Americans that the abandonment of the make-and-break system in America in favor of the jump spark is proof conclusive of the superiority of the latter, but it is, rather, evidence of foreign influence instead of superior merit, and evidence of a return to the simpler system is easily found.

An easy comparison of the two sparks is made as follows: Pass a strip of paper between the points of the jump-spark plug and the paper will be perforated by the sparks, leaving a line of minute holes. To get the actual size of the spark in the cylinder, in the presence of the compressed charge, the points should be separated one-fourth inch or more, for it is well known that the compressed air is an insulator, and that engines will frequently miss on full charges which will fire regularly when the charge is throttled, thus proving that there is a larger and better spark when there is no compression.

Connect one wire of the make-and-break system to a piece of sheet metal on which is placed a sheet of thin paper, preferably held one-thirty-second of an inch above the surface of the metal. Connect the other wire to a common pin and push the point through the paper, after which pull the pin away quickly. A large spark will follow, burning a hole through the paper, frequently one-eighth of an inch in diameter. Compare the area of this hole with the area of a minute perforation made by the jump spark, remembering that the make-and-break spark is also longer, and it will be seen that the volume and heat of the make-and-break spark is much larger, on which account it will fire a less perfect mixture, and thus secure more reliable action and greater economy.

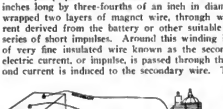
The following description will bring out further the advantages and disadvantages of both systems:

The jump-spark system requires a source of current having a high amperage, although most jump-spark coils require only a low voltage. Dry cells are usually employed to furnish this current, and are a frequent source of trouble, because although apparently capable of giving considerable electrical output, they are unable to furnish the large amperage needed, with the result that the operator blames everything else, and

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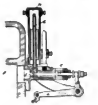
spends much time looking for trouble before trying a fresh set of batteries. Other operators, in order to make sure that they have ample current, fit batteries, or mechanical generators, of such power that the coils are damaged with consequent trouble more difficult to find but no less present.

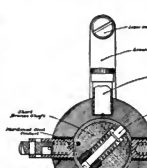
The jump-spark coil consists of a core of soft iron wire about six inches long by three-fourths of an inch in diameter, around which is wrapped two layers of magnet wire, through which the primary current derived from the battery or other suitable source is passed in a series of short impulses. Around this winding is a half mile or more of very fine insulated wire known as the secondary wire. When an electric current, or impulse, is passed through the primary wire, a second current is induced to the secondary wire. The electric impulse in the primary wire is low in voltage or intensity, and high in amperage or quantity because of the few turns and short length of the wire, as well as its large size, but because of the small size and large number of turns, the impulse in the secondary wire is of very high voltage and very small amperage. This high voltage causes this spark to jump a considerable air gap, on which account the high-tension wires must be carefully insulated, and, as used in motor-car work, are ordinarily encased in rubber of such thickness that they resemble ropes one-half inch or more in diameter. A suitable spark for motor use must be able to jump an air gap of three-eighths to three-fourths of an inch at atmospheric pressure, and a spark of this power, if protected against leakage, will successfully jump in the compression chamber the usual gap of about one-thirty-second of an inch found in the spark plug as commonly constructed.



Wiring on five terminal vibrator coils for jump spark. This sketch does not show the complication of the vibrator nor of the timer on the motor

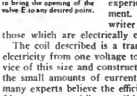
In order to produce a rapid succession of impulses some device is used which alternately connects and breaks the primary current derived from the batteries. The usual form of breaker is a magnetic hammer, arranged at one end of the core of the coil, so that when a current passes through the coil the magnetism of the core attracts the hammer and breaks the contact, thus stopping the current. This destroys the magnetism and permits the hammer to spring back again, restoring the contact and repeating the action. This action is so rapid as to cause a buzzing noise, or even a musical note, and the device is termed a "vibrator." It contains all the essential elements of the make-and-break device, used in connection with the make-and-break spark except that these parts are smaller and lighter and are fitted to the coil instead of to the cylinder of the engine, partly inside. They are more handy to adjust and care for than similar parts on a hot engine, but, being smaller, they are more delicate; and the presence of a high-tension current of electricity renders many sharp and unpleasant shocks, the almost certain experience of every motorist using this arrangement. After a long experience with both, the writer prefers handling hot parts rather than those which are electrically charged.


A Hot Air Tube Igniter, with a geared timing attachment for regulating the point of firing. G is the hot tube enclosed within a cylindrical case having a perforated cap. Pt. at the top. The heat of the tube is maintained by a gas flame within the cylindrical case. The link B operates the levers. A and D, so as to open the valve. E, which is normally held closed by the spring. C, bearing on its rod as shown. In opening the valve so the point in the cycle at which the cam actuates the link, B, then compressing the spring. C, and opening the valve, D, the interior of the hot tube, G, is brought into communication with the combustion chamber, F, of the cylinder. The time of ignition may be varied by adjusting the throw of the cam, so as to bring the opening of the valve E to any desired point.

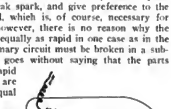


A JUMP SPARK TIMER

The coil described is a transformer, *i. e.*, a device for transforming electricity from one voltage to another, and it is well known that a device of this size and construction has a very low efficiency. Because of the small amounts of current used it is difficult to measure them, but many experts believe the efficiency of a jump-spark coil to be not over fifty per cent., while a well-known expert recently assured the writer that many coils did not have an efficiency of over ten per cent. It is a frequent occurrence to see a large spark at the vibrator, and there is always more or less spark present there; hence it is absolutely certain that a jump-spark coil using a given quantity of electricity cannot produce so large a spark at its secondary terminals as is possible at the primary terminals, if properly arranged. Many people have convinced themselves by trials that the jump spark is the more economical, but this result was obtained because of the superiority of the jump-spark apparatus used, and in spite of the lack of economy of the jump-spark system instead of because of the superiority of the system. When two systems are compared it is quite evident that both should be equally well made and well designed, but, in comparing the jump-spark system with the make-and-break, most people unthinkingly compare the light vibrator of the jump coil with the slow-moving parts used in the ordinary stationary engine to produce the make-and-break spark, and give preference to the former because of its high speed, which is, of course, necessary for motor-car work. Mechanically, however, there is no reason why the make-and-break parts may not be equally as rapid in one case as in the other, for in both systems the primary circuit must be broken in a substantially similar manner, and it goes without saying that the parts may be equally light, equally rapid and equally satisfactory if they are designed and constructed with equal ability.

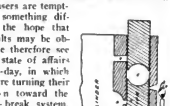

A form of Jump spark coil showing plainly its mechanical complication.

In the make-and-break system, the primary current is provided with terminals inside the cylinder, but, since this current has no appreciable tendency to jump or leak, very little insulation is required, and the points must be brought together in order to cause the current to flow at all, after which they must be separated quickly to produce the spark. In addition to the batteries or other source of electricity, a coil is introduced in the circuit. This coil may be of the same size as the core and primary winding used in the jump coil, but it is customary, because of the slow-speed service to which it has been applied in the past to use a longer and larger core, a coarser wire, and six, seven or eight layers instead of two. Such a coil requires considerable time to become saturated, and also considerable time to discharge, with the result that the spark will continue to bridge the gap for an appreciable time after the terminals have been separated. This length of time is of no particular value so far as igniting the gas is concerned, but is a detriment for high-speed work. The delicate secondary wire of the jump coil is avoided in the primary type of coil.



DeDion circuit breaker. Full lines indicate make hob weights at rest. Dotted lines indicate extreme positions. The circuit is closed at lowest position and broken by rebound of bob.

Within the last year an appreciable change of sentiment has taken place. In spite of the best efforts of maker and user the high-tension spark continues to frequently prove a source of trouble, and, knowing its faults, users are tempted to try something different, in the hope that better results may be obtained. We therefore see a peculiar state of affairs existing to-day, in which motorists are turning their attention toward the make-and-break system, while launch people are following a year or two behind and adopting the jump system.

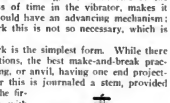


SLIDE VALVE IGNITION
A, Charging port. B, Igniting port. C, Transfer port. D, Flame. C fills with mixture when opposite A and ignites at D, and transfers flame to B.

Of the final outcome there can be no doubt. The single-circuit make-and-break system will win, because it is one circuit instead of two; because it is low-tension instead of high; because it is more pleasant to handle, more easy to carry, and because mechanical parts are more visible and tangible than a multiplicity of electric wires carrying an invisible current which is striving to leak away at every opportunity.

Further, it produces a larger spark with the same amount of current, or, for a given-size spark, it is more economical if equally well made up. In the matter of spark advancing, the small size of the jump spark, coupled with the loss of time in the vibrator, makes it imperative that the jump spark should have an advancing mechanism; but, with the make-and-break spark this is not so necessary, which is another argument in its favor.

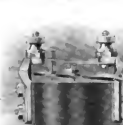
Finally, the make-and-break spark is the simplest form. While there are several varieties and modifications, the best make-and-break practice to-day utilizes an insulated plug, or anvil, having one end projecting into the firing chamber. Near this is journaled a stem, provided with an arm on the end within the firing chamber, which arm contacts with the insulated plug. To the outer end of this stem is attached a clamp, and, journaled on the stem, is a movable piece termed a hammer. This hammer is lifted one way by a cam and thrown back again violently by a spring. A second spring holds the clamp and hammer in contact, except during the period when the hammer is lifted by the cam. These parts largely correspond with the hammer-blow vibration parts of the jump coil, but are not so delicate. From the insulated plug a single wire runs to the



A JUMP SPARK TREMBLER
A, Tension screw. B, Contact screw C, Contact spring. D, Hammer. E, Cams. F, Battery. G, Condenser.

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single binding post of the alternating magneto, which is often driven direct from the shaft of the motor. This arrangement needs no spark coil and is the simplest and best form yet seen. A battery and coil can be used, if desired, instead of the magneto. Every system has some faults and troubles of its own, and the principal objections to this system are the magneto, with its driving gear, bearings, oil-cups, etc.; or the battery, which runs down quickly because of the long contact at slow speeds. These faults are, however, common to the jump-spark system also.



NEW DURR EXPLODER

We must look forward to a more perfect system than either the jump or the make-and-break. If we cast them out, what shall it be?

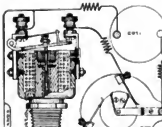
In designing the perfect igniter, as in any other mechanism, progress is toward the complex, but improvements are from the complex to the simple. The piano is better than the tom-tom, and this is progress; but of two pianos giving the same result, the simpler is preferable. These facts apply to all mechanical devices, and will inevitably be applied to motor-car ignition. The two questions before us are, first, what is best; and, second, what is simplest? If both can be found in one form, that form is certain to be adopted. If, however, the best is more expensive, or has one or more similar disadvantages, the simplest form will probably prevail, because price is a factor of great potency with the American people, and price, rather than quality, generally decides for or against purchase.

In the ignition problem it has seemed easier and simpler for the motor builder to buy spark-plugs, jump-spark coils, commutators and dry cells rather than design and fit to his motor a make-and-break device, which, although simpler, costs him more in small lots at least.

The superior size of the make-and-break spark, and the superior results obtained by it, point so strongly toward it as the future form that we at once wonder whether it can be, not only better, but, at the same time, simpler and cheaper. We wonder whether it can be made to combine its own superior features with those of the other system, and this invites us to examine closely the development of the jump-spark system, that we may utilize this knowledge in connection with the make-and-break.

In the development of the motor car, high-speed motors were considered necessary, hence it has been believed by many that make-and-break parts could not be of sufficiently high speed. It will be found, however, that the two systems have much in common, and motors using make-and-break spark ignition have been constructed capable of running three thousand revolutions per minute, so there need be no question about ability to run at the desired speed. The jump-spark system first gained great prominence on the De Dion tricycles, and one of the causes of this success is found in the vibrator or circuit breaker used. This vibrator consisted of a steel spring carrying a V-shaped pendulum bob, or weight, at its free end. When this spring was caused to vibrate, the movement of the bob brought the spring into contact with a point, provided for the purpose, and closed the electric circuit through the point. Vibration in the opposite direction broke the circuit, and the point was so adjusted that the circuit remained broken when the vibration ceased. This bob was actuated by a circular disk having a notch cut in one side into which the bob was free to fall at a predetermined position of the motor shaft. After falling into this notch it made one or more contacts with consequent sparks and then ceased vibrating, leaving the circuit broken and the batteries absolutely protected from short circuit. By this arrangement it was impossible for the user of the vehicle to damage the batteries by needless use or abuse.

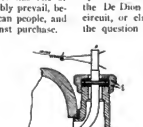
It was found, however, that at slow speeds the bob was not permitted to fall with sufficient rapidity to make a strong vibration, and, consequently, the spark was not always of the greatest strength, so it has become common to put the vibrator on the coil and depend upon its buzzing to indicate whether or not the batteries are needlessly in circuit. The strength of the buzz also indicates the strength of the battery, and the adjustment of the coil. Experience with these vibrators has shown that the hammer-blow form is the most satisfactory, because it produces the most rapid break. This fact has been well known by users of the make-and-break spark for many years, and practically all American gas engines using make-and-break spark use the hammer-blow form of breaker. In the jump-spark coil, the vibrator is operated by the magnetism of the core of the coil, and this is also done in the magnetically operated make-and-break igniters. This magnetism, however, is not of large amount, and, in consequence, the vibrators are exceedingly delicate, need careful adjustment, must be accurately, but lightly, constructed, and are readily put out of adjustment by small particles of dirt, or even by the oxidization of the contact points. To overcome these defects, separate magnets have sometimes been provided to operate the vibrator, in order to secure more certain and rapid action.



WIRING OF A NEW-DURR EXPLODER

In the make-and-break device, the parts are not delicate. They are operated mechanically, and therefore with great certainty, and, as has been shown, the spark produced is of much greater size and intensity.

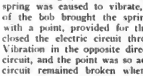
From the above statements, it will be seen that the one desired good feature which has been possessed by the jump spark, and not by the make-and-break, is that protection of the batteries secured by the De Dion vibrator arrangement, which absolutely prevents short circuit, or else that warning "buzzing" secured by the vibrator; and the question at once arises, Cannot the make-and-break be provided with this safeguard? Since the primary circuit is dealt with in either case, and since in every respect the conditions are the same, except that the break of the primary circuit is in one case inside the cylinder, and in the other case outside, it becomes at once certain that the results found in one system can be duplicated in the other. In one of the accompanying sketches is shown an ordinary make-and-break device slightly modified, so that, like in a De Dion vibrator, the mechanical movement of the sparker-operating parts lifts the hammer, or weight, away from the contact point instead of toward it, as in the usual form, and puts under tension a spring of sufficient strength to throw the proper parts into contact, and on the return vibration to break this contact, producing the spark, finally stopping with the points out of contact. In this way but one spark can be produced, and this spark is of the maximum size, as determined by the coil, the source of current and the pendulum length or time of contact. In the arrangement shown, unlike in the De Dion, the action cannot be interfered with by slow movement of the engine, so the spark is always of equal intensity, whether for starting on a cold morning or for running at the most rapid speed. This is of particular advantage in rendering a motor easy to start, for everyone knows that difficult starting is one of the greatest objections now raised against gasoline motor-cars. It is further well known, particularly by those who use meters to test their cells, that a dry cell picks up or accumulates a current considerably greater than it can steadily deliver. In the ordinary forms of ignition this excess is dissipated at the first contact, and is of no value for practical use. In starting, for example, with the jump spark, the vibrations follow each other with such rapidity that the cell has no opportunity to recuperate, and in the ordinary make-and-break spark devices this accumulated energy is dissipated, and the coil is actually less strong when the spark is made than at a period following the first contact. By the device shown only one spark is made, and this is produced by the accumulated energy of the cell, and is the strongest spark possible to make from the source of current at hand.



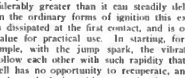
ELEVATION OF MAKE AND BREAK SPARKER. THE FUTURE FORM

A. Wire clamp. B. Insulated anvil. C. Spark plug cap. D, Pivots. E. Sparker stem. G.G. Hammer springs. H.H. Brackets for hammer springs.

Operation: The insulated anvil B is isopposed by mica washers, D, on each side of its flange, these micas being free from exposure to oil. The points of the anvil in turn out of contact with the arm of sparker stem, E normally. The stem is fixed to the clamp and hammer is journaled on the iron. The contact spring holds clamp and hammer together until forced apart by the fall of hammer on a given point. Dotted lines indicate paths described by plunger and hammer. The plunger falls and brings the points of stem and anvil together and strains the contact spring. The hammer then rebounds, breaking the connect and producing the spark. A battery and coil are attached to the insulated anvil by wire and spring clamp, A, in the simplest manner. The ground stem of the iron E, is adjusted to be both lubricated and made gas tight by oil splashing into the device. The entire device is removable for adjustment or exchange. Twisting the anvil compensates for burned points and wear



A MAKE AND BREAK PLUG



PLAN OF MAKE AND FREAK SPARK. THE FUTURE FORM

(Continued on page top)

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A Vacuum Carbureter

By H. D. Dreisbach

A VACUUM carbureter, a brand new thing, which promises to better the motor car and make the airship a success, has been patented by Charles W. Parsons, an engineer in the employ of the Consolidated Manufacturing Company, manufacturers of the Yale motor cars, of Toledo, Ohio.

It is called a vacuum carbureter because its mechanical parts are controlled below atmospheric pressure, all parts working automatically.

The carbureter is divided into two parts, the upper part being used exclusively as a receptacle for the gasoline, while below the copper partition is the carbureter proper. With the gasoline put in at the filling point at the top of the tank, the highly volatile mixture of fluid hydrocarbons has but one exit through a supply pipe leading from the bottom of the tank to within one-half inch of the bottom of the carbureter below. On the opposite side of the carbureter proper is another pipe, which extends perpendicularly from within an inch and a half of the bottom of the carbureter to within a quarter of an inch of the top of the gasoline tank. The bottom of this pipe is funnel-shaped. These two pipes are very important parts of the new device, in that, just as soon, that is instantly, as the gasoline in the carbureter proper is evaporated to the opening of the funnel-shaped pipe, the vacuum on the gasoline tank is relieved and then gasoline is permitted to again flow through the gasoline supply pipe. This flow keeps up until the carbureter is filled up to the bottom of the funnel-shaped pipe. Therefore, these automatic-acting pipes prevent the carbureter proper from becoming too full of gasoline tank. The bottom of this pipe is funnel-shaped. These two not being permitted to fill the carbureter above two inches. A stop-valve in the gasoline supply pipe may be closed while the tank is being filled with gasoline, thus preventing the flooding of the carbureter.

The size of the gasoline tank may be made to hold one gallon, or it may be made to hold five hundred gallons. The size of the carbureter also depends on what you may want to use it for. As the inventor put it—you may make a tank and carbureter large enough to supply gas for the lighting of the largest city on the globe.

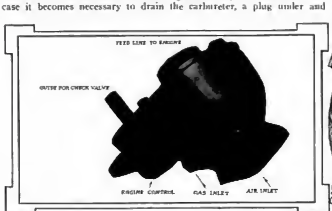
The carbureter is divided into six sections by five wall-like partitions. These partitions are two inches thick and are of absorbent material, encased by wire screens which are cut the exact size for each partition. Through the centre of these partitions extends a U-shaped rod to help hold the walls firmly in place. A sight glass is provided on the side of the carbureter that the amount of gasoline may be determined. In case it becomes necessary to drain the carbureter, a plug under and near the head end may be removed. If at any time it becomes necessary to get at the inside of the carbureter, the head plate may be removed.

The intake valve is located at what may be termed the rear end, as will be seen from the diagram, while the feed line to the engine is located at the other end, or the head, the former extending from the top of the gasoline tank to the top of the carbureter proper, while the feed line extends from the top of the carbureter proper, through the gasoline tank, to the motor. At the base of this feed line is one of the six apartments into which the carbureter is divided, this section also being enclosed by a semi-circular wall of absorbent material. This is the last little room the gasoline flows into in the generation of gas for the feed line. The carbureter is easy to control, as a valve in the feed line between the carbureter and the engine is regulated by a small lever which the operator has under his control, it being connected with the steering wheel.

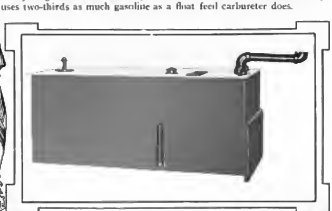
The Carbureter on Knabenshue's airship is a Parsons, the aeronaut having been successful in every flight he has attempted since the new device has been connected to the craft. Before this he was only partially successful. If the incline was made just right, the airship would sail grandly. If it wasn't made just right, the ship would probably soar to the height of a few hundred feet, when the engine would cease to work, because of placing the ship off from level, and the craft would gradually return to the earth. In an attempt to explode the carbureter, the check-valve was taken out, the engine throttled down to weaken the mixture of air and gasoline so as to backfire, but even this attempt failed to make the thing blow up.

The reason the carbureter cannot explode is because the mixture is too rich. You can't explode the carbureter with an electric spark. The mixture won't burn, it can't burn, because, as just stated, the mixture is too strong. That is the reason the inventor has devised the controlling or mixing valve in the feed line to the engine to get the proper explosive mixture, this valve being very easily changed to suit the weather conditions, all done in an instant by means of a little lever. Thus the engine can be supplied with a free, light gas all the time. It is evaporated gas instead of vaporized gasoline.

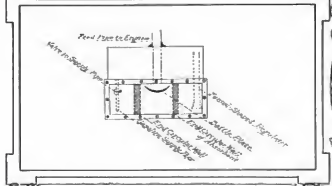
The inventor will give any person the carbureter who will flood it, after the device is attached to an engine. It is an absolute impossibility. When you pull the plug, you never fail to shut off the carbureter. Everything works automatically and the carbureter, it is claimed, only uses two-thirds as much gasoline as a float feed carbureter does.

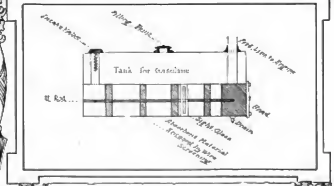


Air Valve Adjustment



Vacuum Carbureter





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SOCIETY FOLK WHO MOTOR

MISS BEATRICE FLAGG, the curly-haired daughter of Mrs. W. Allston Flagg, has a motor car that Newporters concluded had been made to order for the little maid. It is like a basket phaeton with a mushroom top, supported by one standard. Under the mushroom are often seen the roguish faces of Miss Beatrice, the chauffeuse, and Blanche Oelrichs, the school-girl sister of Mrs. Peter D. Martin. Little Miss Blanche, on the distaff side (in the old days wheels ran to make cloth and not for fun, and they never ran away from the home and fireside), is a niece of Mrs. Theodore Havemeyer, of the sugar-refining family. Miss Beatrice is a niece of Mrs. Charles D. Scribner, of the brain-refining family of publishers, and the artist, Jared Flagg, was her ancestor. His portrait of Commodore Vanderbilt hangs in the directors' room of the Grand Central Station.

* * *

LORILLARD RONALDS, who, late in October, bought a 40 motor-power Delauney Belleville, will probably join the motoring honeymooners, for he is engaged to Miss Thora Strong, the cousin of the well-known Washington belle, Mathilda Townsend. The father of Mr. Ronalds is Peter Lorillard Ronalds, who recently gave up poaching for motoring. His mother—and old Peter's wife—is the famous Mrs. Ronalds who is said to have given the Empress Josephine some jealous qualms. Abroad she created a great sensation driving a span of white ponies with rose-colored reins. Preferences of locomotion are most interesting as recorded in the history of the Ronalds family. Young Mr. Ronalds, instead of driving, won something of fame, in his own social set, because he rode "roughly" with Roosevelt in the Cuban War.

* * *

MR. GEORGE BURROUGHS TORREY returns from abroad as the sole motorist with favorable reports in regard to the dispositions of the Brittany and the Normandy peasants. Mr. Torrey explains the whole problem on the same principle contained in the poem about pussy, to the effect that if you treat her right kindly and stroke her gently "poor pussy will do you no harm." But listen, gentle Georgie, the real reason isn't that. They knew you were an artist. The peasants are eager to pose. They make money more easily standing still for the artists than moving around at hard work in the fields. The peasants can "spot" the painters. Such profitable visitors are not to be clubbed with bludgeons and peppered with shot. George Burroughs Torrey—but, of course, dear reader, you know all about it—has painted a portrait of the King of Greece.

* * *

IT was recorded in big type in one of the evening papers as extraordinary that a "Rich man's chauffeur runs machine into a tree to avoid child." It was not the rich man himself, but his chauffeur; so "capital" only in an indirect way gets credit. But rich men aren't all out to mow down poor men's children with their motor cars. Many a kind heart beats under the most expensive of wildcat motor coats. This chauffeur, who doesn't believe in sparing the tree to spoil the child, not to speak of the high-bred occupants, is an employee of J. Langdon Schroeder, he the car was Mr. Schroeder's mother-in-law, Mrs. Jules J. de Neufville, to whom one cannot refer in print without mentioning the fact that she posed for the figure of one of the muses in the painting by Fragiani in the Metropolitan Museum of Art. It is one of the qualifying tidbits pigeon-holed in every respectable dowager's brain.

* * *

MR. and Mrs. William D. Guthrie are among the most enthusiastic of the motorists in Locust Valley, Long Island. Of course, Mrs. Guthrie is never vulgarly enthusiastic about anything. But in entertaining, and as an aid to social intercourse, she always makes use of a magnificent car—one of the sort with glass sides to protect one's festive frock and complexion from the dust. In this car she brought a party to the horse show at Piping Rock Field in October. The Guthries are among those people who have fine stables of horses, yet were quick to adopt the motor car. The white livery of their coaching bugler gained quite a fame on Long Island. Once, when he first arrived, he was practicing long, bleating notes, and the good wife of the manager of the estate was quick to respond to what she thought was the signal for fish. Each time she went out no peddler was there, but was shocked to see a man in white go into the barn, and so flouted her good husband, the manager, for letting his employees go around in their underclothes. It was some time, and only after a closer observation of the objectionable object, that she comprehended the innovation.

* * *

OFTEN the chauffeur of a car nowadays is the millionaire, the owner himself; he delights in running his own car. And not a few of the young maids and matrons find a special prille in driving their cars. In the neighborhood of the Guthrie's Long Island home there are several young women often seen seated alone in their motor cars off for a spin. Mrs. Howard F. Whitney, J. Roger Maxwell's daughter, has commenced this fall to drive her own car. But she belongs to a family that rejoices in swift locomotion. They have everything that goes by electricity, gasoline, sail or steam, on the road or in the water.

* * *

CLARENCE GRAY DINSMORE takes turns with his brother, William B. Dinsmore, not in a motor car, but in occupying the great estate, "The Locusts" at Staatsburg. This estate ranks with that of Levi P. Morton at Rhinecliff—the farm from which comes the golden butter for use in the Union League Club. All the millionaire country gentlemen sell the products of their farms. Butter from the Dinsmore place has been purchased for one dollar a pound. The H. McKay Twomblys have a sort of a milk route, and the ducklings of Howard Gould, when dead, have the honor of having their epitaphs printed on the *menu* at Martin's. Just such a fine farm have the Dinsmores, with every cow groomed as finely as blue-ribbon winners like Reggie Vanderbilt's horses. Motorists, who know only of Mr. Dinsmore's keenness for the same hobby they possess, never think of him as the squire of a great country estate, and, of course, he cares heaps more for motor-cars than for the placid cattle of his Staatsburg home. One of the novelties on Mr. Dinsmore's place is a four-in-hand Jersey ox team, the only one known in the State and possibly in the country. The oxen were born on the grounds and trained for the yoke at a very early age



MRS PERRY BELMONT

Mr. and Mrs. Belmont are touring a great deal this fall in their new Hotchkiss car, which is in the Belmont family colors. Mrs. Belmont's motor attire is a standard for other Mme Modjeskas, Reds and golden browns are her favorite colors for coaching and touring.



MRS GEORGE MESSERVY

Mr. and Mrs. Messervy are among the measuring honeymooners abroad. Mrs. Messervy belongs to the Colgate family, of which there are many members devoted to motoring as a sport.

Photograph by Amie Dupont

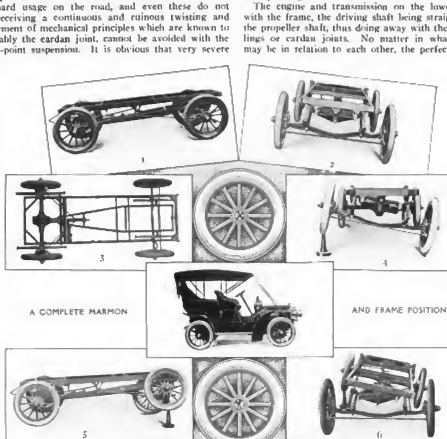
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A Double Three-Point Suspension

THE Marmon patented double three-point suspension is a radical departure from the common construction of motor car running gears. So simple and practical is this new construction and so plainly apparent are its many advantages that one would scarcely question its success in actual use. The wonder is that some such scheme was not worked out long ago. It is the old principle of the three-legged stool which will rest solid where a four-legged stool will not. The importance of the principle of three-point suspension, applied to motor-car construction, has long been realized and many attempts have been made to employ it, but with only partial success in a few instances.

To realize the necessity of a change from common practices one has only to analyze what takes place when traveling over rough roads in a motor car. Strong construction, good springs and pneumatic tires alone have made it possible to build a motor car which would withstand, fairly well, hard usage on the road, and even these do not prevent ears from receiving a continuous and ruinous twisting and racking. The employment of mechanical principles which are known to be objectionable, notably the eardan joint, cannot be avoided with the customary rigid four-point suspension. It is obvious that very severe binding and twisting strains are transmitted through the frames, mechanisms, bodies, wheels and tires of motor cars which have one frame carrying the body and power plant mounted rigidly on all four springs. The springs and tires, which can only afford partial relief, are called upon to perform a greater duty than should be expected of them. This is easily demonstrated by lifting any one wheel of a motor car so constructed. If, for instance, a front wheel is raised a few inches the opposite front wheel will begin to rise, and raising still more a rear wheel will rise, thus showing that strains are not only transmitted through the frame and working parts, but that excessive weight is thrown on one or two wheels and tires.

The Marmon patented double three-point suspension to overcome all of this, permits the use of a straight shaft from engine to bevel gears and results in easier riding qualities than obtainable with other constructions. The principle of the Marmon double three-point suspension is made very clear by the accompanying illustrations, a study of which will reveal its importance in the field of motor-car construction



Figs. 1 and 2 show the side and end elevations of the Marmon running gear as it stands on the level. The engine and transmission have been omitted purposely to avoid obstructing the view of any portion of the suspension system. Fig. 3, a plan view, shows clearly all six of the *pivotal* points of suspension. The rectangular frame which carries the body only is mounted on the two rear springs with *transverse pivotal* supports and is supported in front with one *longitudinal pivotal* connection in the middle of the lower frame. The lower triangular frame which carries the power plant is mounted on the two front springs with *transverse pivotal* supports and the rear end is supported in two bearings on the sleeve or quill which contains the driving or propeller shaft. These two bearings being concentric with the driving shaft are in effect the same as one *longitudinal pivotal* support. These bearings permit a movement around the sleeve or a movement of the sleeve within the bearings. The driving shaft is shown protruding forward from the sleeve, which is rigidly fixed to and is a part of the rear axle construction. The cross member at the front end of the triangular frame to which the upper frame is pivoted is also pivoted at each end in bronze bearings affording a slight movement, which, in connection with the central pivot, permits of any angular change between the two frames. The strains occasioned by the tendency of the outer rear axle structure to rotate, when driving and setting the brakes, are taken by the sleeve projecting forward from the rear axle, it being held firmly within the two rear bearings of the lower frame. Thus the driving shaft is relieved from these strains, as are also the rear springs.

The springs form no part of the suspension system, except as supporting members, and they are relieved from driving strains by means of radius rods extending from the rear to the front axle, as shown clearly in Fig. 2.

The engine and transmission on the lower frame slope rearwardly with the frame, the driving shaft being straight and rigidly clamped to the propeller shaft, thus doing away with the necessity of flexible couplings or cardan joints. No matter in what position the two frames may be in relation to each other, the perfect alignment of the driving shaft is maintained without any binding or twisting strains upon it or any other part of the driving mechanism. The illustrations showing the wheels raised not only demonstrate this fact, but they show also that each of the four wheels maintains its proportion of the weight and that all four wheels have a firm footing at all times.

Fig. 4 is a front view showing one front wheel raised twelve inches, and that the lower frame is tilted, but that the body frame transversely is level. Fig. 5 shows the relative position of the two frames in a side view with one front wheel raised, and the upper frame raised vertically, but not tilted. It is raised vertically *one-half* as much as it would be in any other car. When meeting an obstruction the springs, of course, absorb *some* of the shock, but by reason of the pivotal points of the frame suspension the wheels are permitted to ride over the obstruction with a freedom which relieves, to a remarkable degree, the tires, the car and its occupants from the effects of the shock. The wheel base here illustrated is 90 inches and the car rides as easy as would a rigid four-point suspension car of 180 inches wheel base.

Fig. 6 is a front view with one rear wheel raised twelve inches, while the lower frame, transversely, is level, the conditions being simply reversed from those shown in Figs. 4 and 5.

Fig. 7, side view with rear wheel raised, shows that the rear of the lower frame is raised vertically, the pivots on the front springs permitting this movement without binding strains.

Fig. 8 is a remarkable demonstration of the double three-point suspension. It is an exaggeration of road conditions which are being constantly met in small or large degree. One rear wheel is raised twelve inches and the opposite from wheel is also raised twelve inches. Both frames are tilted, each to the same extent as shown in the front views, Figs. 4 and 6. The other two wheels rest solidly on the ground, but the power plant and the driving mechanism are still in perfect alignment with

(Continued on page 114)

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Mechanical Briefs of 1906 Models

WINTON "K."



"K—ORKER. That's what the letter K stands for," said Mr. Charles B. Shanks, general sales manager of the Winton Motor Carriage Company, in his private office at the end of the sixty-foot end-door exposition railway car designed and built by the company for exhibition purposes to introduce their new $4,500 model K in advance of the shows. The freight car was located in New York during the first week of October, at One Hundred and Twenty-ninth street and North River, beneath the viaduct, its tour having begun at Cleveland on September 24. After a week's stay at New York, Philadelphia and Pittsburg were next visited, and it is expected that, weather permitting, the tour will last until Thanksgiving Day, the final stop being made at Los Angeles, California.

The body of the exhibition car exteriorly was colored the well-known Winton red, and had on both sides an immense oil painting of the new model K and a gorgeous illustration of the Winton plant, with lots of green fields and blue skies surrounding it. Between these appeared the Winton escutcheon in gold and red and black. A broad flight of steps for the convenience of visitors led to the body of the car at one end. The interior decorations were in white enamel and gold striping, the floor being covered with green linoleum and rugs to match. Three hundred incandescent electric light bulbs were arranged in rows on both sides and the ends of the car, just above the decorative frieze which has laurel-wreath panels surrounding a capital W.

Mr. Shanks's private office at one end of the car was partitioned off from the show space and fitted up in magnificent style with solid mahogany roll-top desk and chairs, green silk sash curtains shading the light; a typewriting and stenographic assistant being a convenient accessory.

The railway car was steam-heated, and, in addition to the electric light circuit, contained a full Pintsch gas-lamp outfit. The coming of the show-car had been widely advertised in all the metropolitan dailies, and as a result the car was crowded from the time of its arrival to its departure with interested spectators, all curious to inspect the new model.

The front end of the car contained on its walls heroic-size tracings of the new model K, and on shelves conveniently arranged were a full line of the principal component parts. On the floor stood a complete chassis superbly finished and a complete model K finished throughout in dark blue with brass trimmings.

The new model K, while following the general practice of the Winton product, contains some very radical but excellent new features, still including, however, all those features which practice has found to be essential and desirable in a car of this high grade, with all tentative features of doubtful utility omitted.

Looking at the motor it was found that the first change in it is in the size of the cylinders, which are now 4¼ bore by 5-inch stroke; are made of specially tough stock to receive a mirror finish so as to provide against loss of compression. The new crank shafts are of specially treated carbon steel, having a tensile strength of 95,000 pounds to the square inch. On the gears driving the water pump, crank shaft, etc., rawhide gears intervene between the other gears so as to eliminate noise and reduce the wear.

The ignition is still by jump spark, with current supplied through a six-volt accumulator and one set of dry cells carried in a locked box on the running board. The commutator is new, of the roller-contact type, with hardened steel contacts, making it practically everlasting. A unit spark coil is carried on the dash, the spark lead being on the steering column. The Winton ignition system now enables a motor to start from the seat without cranking, which is, needless to say, an obvious advantage, because it saves physical exertion, spares the motor from unnecessary running, and is, of course, a great factor in touring. An option, however, is furnished so that a magneto can be substituted instead of the regular ignition equipment.



THE WINTON TRAVELING "SHOW."

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Lubrication is now by means of eight-lead Hill precision oiler with a sight-feed attachment placed on the dash, no valves being used in this system, which absolutely forces the oil through every feed at comparatively low pressure, but if for any reason oil congeals in the tube, as is possible in our northern latitude, the pressure increases to one hundred pounds to the square inch and drives the oil to the bearing, the pressure being at all times mechanical and wholly without air pressure and gravity feed. The motor is now fitted with a special carbureter made exclusively for model K by Holley Bros. Company. The carbureter is of the float feed type, the float being concentric with an aspirating nozzle, and is automatic and compensating. Regarding economy of fuel, it is claimed that its consumption is but eighth-tenths pounds of gasoline per motor power per hour. The well-known Winton system of individual clutches has been retained, but the double-cone high gear has an increased surface. The drive is by longitudinal shaft, with extra heavy hardened and ground universal couplings



INTERIOR OF WINTON TRAVELING CAR.

enclosed in a grease-tight metallic case, which is provided with a plug for replenishing the grease. These coupling casings are telescopic and annular in form, and constantly revolve in the lubricant so that the gears are wholly protected from foreign substances.

The new rear axle is of the floating type. It is made of a special steel having a tensile strength of over 100,000 pounds to the square inch, and specially designed Timken roller bearings are used on it. It is one of the most accessible axles ever built. The whole axle, the differential gear and the differential bearings can be removed without the use of a jack or pit, the car meanwhile remaining supported by the wheels, showing that there is no load on the driving axle. The axle merely transmits the power, the weight of the car being carried on a heavy drawn steel tube tapered from the center to the axle ends which surrounds the axle.

The front axle is remarkably strong, a one-piece I beam construction of manganese bronze, its tensile strength being 90,-

(Continued on page 114)

GLIDE MODELS E AND F

GLIDE is an appropriate name for a motor car and is highly suggestive of smooth going. The name is particularly appropriate in the new Glide model F light touring car, because all the mechanism of this car is carried on one set of springs, and the body and passengers on an independent set of springs. It is obvious that this system makes a car an easy riding one, and, moreover, trebles the life of the mechanism.

The car itself is designed to meet the views of a large number of buyers who are partial to the double-opposed type of motor, and who desire a light touring car at a moderate price, the car being sold at $1,250. The cylinders are 5 x 5 and develop 18 motorpower. Ignition is by jump spark with dry-cell batteries; a planetary form of transmission is used, the drive being direct on the high speed. The wheel base is 80 inches, the tread being standard. The car is fitted with tubular steel wheels of the artillery type, 30 inches in diameter, the car complete weighing about 1,600 pounds.

The model E Glide, costing $3,000, is a high-powered touring car, the tonneau of which is detachable, so that the car can easily be converted into a Glidebout for two passengers. The power plant consists of a four-cylinder vertical motor in the front, having individual cylinders 4½ x 5, the pistons being fitted with oil recesses and four rings, each ring having square-cut joints. The connecting rods are drop forged, adjustable at both ends, and bushed with bronze and babbitt bearings. A drop-forged crank shaft is used, ground to an accurate size and having four bearings. The crank case is made of special aluminum alloy and is divided horizontally into halves, the upper half containing all the bearings and the lower half serving only as an oil-pan. The supporting arms are cast on the upper half of the crank case, so that the lower half can be taken off for adjustment of the bearings without disturbing any of the connections on the motor. Valves are drop forged and interchangeable. The inlet and exhaust pipes can be readily removed by loosening four nuts. What is called the push-nipple construction is used on these pipes, which does away entirely with the use of gaskets in the joints between the pipes and cylinders.

The ignition is by jump spark, storage and dry-cell batteries, the commutator being of a special design with hardened steel contacts and the terminals protected by a glass cover. The commutator is fitted to the end of a vertical shaft, which is driven from the cam shaft by a pair of spiral gears, the whole construction being housed and run in oil.

The motor, at 800 revolutions per minute, develops 24 motorpower, and 30 motorpower at 1,000 revolutions per minute, the maximum being reached at 1,500 revolutions per minute.

Cooling is by means of a cellular radiator with fan and a gear pump made entirely of bronze, excepting the bearing shafts, which are of steel. Th pump is directly attached by a self-centering square jaw coupling it to the end of the cam shaft, and is readily removable by taking out four bolts.

The drive is by bevel gear and propeller shaft to the rear axle. The frame, the fenders and the footboard are all of pressed steel, the motor hood being of aluminum, hinged and removable. Lubrication is by means of a positive-feed lubricator, and the gasoline capacity is eighteen gallons.



GLIDE—MODEL E

The bodies of this model are finished in automobile gray or royal blue with gray or cream running gears, the upholstering being red, black, green, tan or gray leather, and cape, canopy or victoria tops are furnished, the car having a seating capacity for five persons.

Specifications model E, Glide: Price, $3,000; body, double side entrance tonneau, with individual front seats; weight, 1,900 pounds; seating capacity, five persons; wheel base, 103 inches; wheel tread, standard; wheels, 32 inches, wood, artillery type; tires, 32x4 inches; frame, pressed steel; motor, vertical four-cylinder, in front under hood, 4½x5 individual cylinders; motorpower, 30; cooling, water; ignition, jump spark; drive, bevel gear; transmission, planetary in oil; speeds, two forward, one reverse; lubrication, positive-feed lubricator; hood, aluminum, hinged and removable; brakes, emergency on rear wheel hubs, halting on transmission gear; complete equipment.

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Mechanical Briefs of 1906 Models

THE NEW FRANKLINS

FRANKLIN, as a name, stands for a great deal in American history, both motoring and otherwise, all of which to repeat here would be the veriest platitude, but since 1903, when the Franklin air-cooled runabout was in far cruder shape than it is to-day, it has demonstrated in unanswerable fashion that the Franklin air-cooling system cools.

Franklin principles have proven themselves the best foundation on which to build an enduring standard type of an original American motor car. The first Franklin four years ago had four air-cooled cylinders; and was built for power, lightness and strength, without regard to cost. It was the first car of the kind in America. To-day the majority of manufacturers are coming around to four-cylinders. Many have adopted air-cooling, and all are trying to build lighter and stronger. But while they have been experimenting—with one cylinder, two cylinders, three cylinders; motor one year under the seat, next year somewhere else; this kind of springs, frame or body to-day, a different kind to-morrow—the Franklin has made air-cooled large cars as successfully as they have small ones.



MODEL G

For 1906 the Franklin product will be represented by four principal models: Type G, a new light touring car; type D, a four-cylinder touring car; type E, a gentleman's roadster or runabout, and type H, a new six-cylinder 30 motorpower Franklin car. The six cylinders have the same advantage for a very high-power car that four cylinders have over any smaller number in a car of moderate power. The engine force is divided into six impulses, which balance the motor rotation with extreme evenness and produce the utmost smoothness of running and flexibility of operation. They also permit tremendous power and speed without a corresponding increase of weight or strain on the car. This great increase of power and smoothness of motor-action are particularly noticeable on hills.

The 1906 improvements on the Franklin car are not only numerous, but notably good mechanically. On all the touring cars the clutch and brake levers are put forward out of the way, so that the operator can get in and out of the car easily. On the E car they are placed inside and forward. All the models, excepting the E car, are shaft driven, the E car still retaining the single-chain drive. All the working parts—motor, commutator, carburetor, steering gear, transmission, drive shaft, knuckles, etc—are completely protected against dirt and dust, the throttle governor being also foolproof.

On the models G, D and H an improved and more effective carburetor is used which is positively automatic through any range of speed. Lubrication, which means a great deal on an air-cooled car, is now by means of a force pump. The oil feeds are positively adjustable and directly in sight on the dash. There is one feed to the transmission, two to the motor base on model E, two to the motor base on model G and four on models D and H. The oil pump is driven by a wire belt which will not slip should oil be spilled on it; neither will it stretch. The clutch on types D, G and H is of the multiple dive type, and takes hold without any jerking, relieving the transmission and driving mechanism from all strain. Besides this it is completely enclosed and runs in oil.

On models G, D and H ball bearings are used on the outside end of the rear axle and transmission. Larger and more effective brakes are also used.

The differential gear is in an oil-tight case and so arranged that one oiling does for three or four months without any oil getting on the brakes.

A new commutator is used which is almost non-wearoutable and perfectly synchronized. On models D and G a suction-fan flywheel is now placed at the rear of the motor and a cooling fan on the front of the motor of model D, but no change has been made in the Franklin motors of last year.

The Franklin cars, of course, retain the Franklin auxiliary exhaust of last year, which was the most important improvement yet made in air-cooling methods. It consists of a port with a valve at the bottom of the stroke. This lets the hot, high-pressure gases out before the main exhaust valve opens, thus reducing the back-pressure and maintaining the combustion chamber at temperature of maximum efficiency. That it increases the power of the engine is without doubt, because it keeps the exhaust valves from getting burned and pitted, and also keeps carbon deposit out of the combustion chamber almost completely. It certainly keeps the spark plugs from fouling and allows the use of graphite lubrication in the motor.

The inside of the cylinder, the piston and the piston heads are polished and ground, and the combustion chamber is machined, which deflects heat, decreases heat surface in the motor and increases its efficiency.

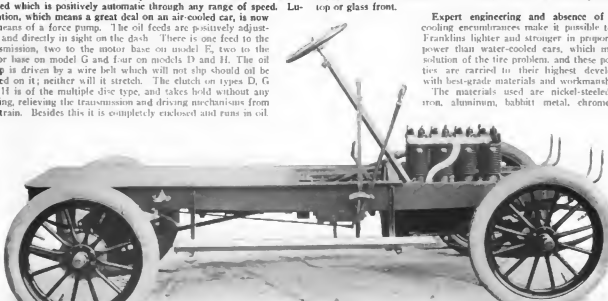
All the valves are mechanically operated and easily removed, every part of the motor being easy to get at by simply raising the hood, which tilts forward. Being shaft-driven, the four-cylinder motors are placed "fore-and-aft" under a long, rounded hood.

Turning to the body, it is noticed that the side doors on this year's cars open toward the front. They are hung on extension coach hinges, which allow them to swing clear open. They give the greatest possible space for entrance, and make getting in and out of the car very easy. The door, in this position, cannot strike the mud-guard, and if left open cannot be torn off by striking anything, because it is sure to be closed by the forward movement of the car.

Improved mud-guards are fitted on all the cars (excepting model E), which afford better protection from mud and dirt than heretofore. On model E there is a combination ironing which will take any kind of a top or glass front.

Expert engineering and absence of water-cooling encumbrances make it possible to build Franklins lighter and stronger in proportion to power than water-cooled cars, which means a solution of the tire problem, and these possibilities are carried to their highest development with best-grade materials and workmanship.

The materials used are nickel-steeled, cast-iron, aluminum, babbit metal, chrome steel,



A FRANKLIN CHASSIS

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phosphor bronze, spring steel, steel tubing, pressed steel, drop-forged steel, steel stamping, steel plates, brass and wood. Each material is employed for its adaptability to its particular use without regard to expense —nickel steel for strength, aluminum for lightness, wood for flexibility, etc.

Steering knuckles, gears and shafts in transmission; main drive shaft, rear axle and bevel-gear at end of drive shafts are of nickel steel. Front and rear axles, steering tube and steering connecting rod are steel tubing. Cylinders and valve seats, piston, exhaust yoke and fly-wheel are cast iron. Steering knuckles, steering yoke, spring chair, walking beams on the valve motor support, crank shaft, universal shaft yoke, all levers and connecting rod of motor are of drop forgings. All bearings of crank shaft are hard babbitt metal, die-cast to exact size under enormous pressure. Ball bearings are of chrome steel. Base, cheek piece (end of motor shaft), transmission case and body of car are aluminum.

Every Franklin car has an aluminum body, mounted on four full elliptical springs, which completely take up all kinds of road shocks. Aluminum is both stronger and lighter than wood; will not open up in cracks, nor split, nor splinter in an accident; is easier to repair, and holds its finish better.



MODEL D



MODEL E

Wood is used for sills and dash, because it takes up vibration better than metal. Wood is the most suitable of all materials for this purpose; the strongest of its weight; the lightest of its strength. Wood, it is claimed by wagon and coach builders, with ages of experience, is as truly the one correct material for this particular use as it is for tennis rackets, where steel would not do at all.

SPECIFICATIONS MODEL H

This car is built on the same lines as Model D, but is larger and more powerful. The same specifications apply except where noted below:

WHEELS: 34-inch, Wood artillery type.
TIRES: 34 x 4 front; 34 x 4 rear.
WHEEL BASE: 114.
MOTOR: Six-cylinder, 4 x 4.
PRICE: $4000.
RATE OF SPEED OR REVOLUTIONS: 300 to 1000.
FRANKLIN MOTOR POWER: 30.
APPROXIMATE MAXIMUM SPEED: 50 miles.

APPROXIMATE TOTAL WEIGHT: 2400 lbs.

SPECIFICATIONS OF NEW FRANKLIN MODELS

	Model E.	Model G.	Model F.	Model C.	Model G.	Model D.
CARBURETER.				Float feed automatic type.	Float feed automatic type.	Float feed automatic type.
REAR AXLE.	Divided driving axle running in tubular axle on Hyatt roller bearings.	Divided driving axle running in tubular axle on ball-bearings. Bevel gears held in absolute alignment. Bevel driving gears supported at each end by bearings.	Divided driving axle running in tubular axle on ball-bearings. Bevel gears held in absolute alignment. Bevel driving gears supported at each end by bearings.	Jump spark, with 4 coils on dash. Current from batteries.	Jump spark, with 4 coils on dash. Current from batteries.	Jump spark, with 4 coils on dash. Current from batteries.
IGNITION.						
CONTROL.				Throttle and spark.	Throttle, spark and governor.	Throttle, spark and governor.
FRONT AXLE.	Tubular with Timken roller bearing front wheels.	Tubular with Timken roller bearing front wheels.	Tubular with Timken roller bearing front wheels.	Planetary.	Sliding.	Sliding.
TRANSMISSION.						
SPRINGS.	30-inch, full elliptic.	36-inch, full elliptic.	40-inch, full elliptic.			
WHEELS.	28-inch, Wood artillery type.	28-inch, Wood artillery type; 12 spokes.	32-inch, Wood artillery type.	2 speeds and reverse, High and low speed controlled by lever; reverse operated by foot.	3 speeds and reverse, fitted with ball-bearings.	3 speeds and reverse, fitted with ball-bearings.
SPEEDS.						
TIRES.	28 x 3.	760 x 90 front; 760 x 90 rear.	32 x 3½.	Chain.	Bevel gear.	Bevel gear.
DRIVE.						
STEERING GEAR.	Double-acting Raymond brakes, with equalizer on each rear wheel.	Double acting Raymond brake on drive shaft operated by foot. Two double-acting Raymond brakes, one on each hub, operated by hand lever.	Double-acting Raymond brake on drive shaft operated by foot. Two double-acting Raymond brakes, one on each hub, operated by hand lever.	Irreversible wheel.	Irreversible wheel.	Irreversible wheel.
BRAKES.	Brakes applied on both wheels with same force. The brake mechanism has an equalizer, by which the same braking force is applied on each wheel.					
BODY.				Aluminum, built on steel angles; divided seat. Special soft cushions.	Aluminum; two side doors, divided front seat. Single seat for three behind.	Aluminum; two side doors; divided front seat. Single seat for three behind.
TANK CAPACITY.	7 gallons gasoline, 6 pints lubricating oil.	7 gallons gasoline, 6 pints lubricating oil.	12 gallons gasoline, 6 pints lubricating oil.			
HOOD.				Aluminum; lift-up or instantly removable.	Aluminum; tilting and instantly removable.	Aluminum; tilting and instantly removable.
TARAD.	Standard.	Standard.	Standard.			
EQUIPMENT.				2 oil side-lamps, 1 rear lamp, 2 headlights, horn, complete tool equipment.	2 oil side-lamps, 1 rear lamp, 2 headlights, horn, complete tool equipment.	2 oil side-lamps, 1 rear lamp, 2 headlights, horn, complete tool equipment.
WHEEL BASE.	85.	88.	100.			
MOTOR.	Four-cylinder, 3½ x 3½ individual cylinders.	Four-cylinder, 3½ x 3½ individual cylinders.	Four-cylinder, 4 x 4.			
PRICE.				$1400.	$1800.	$2800.
	Intake and exhaust valves mechanically operated, both valves and seat easily removable, all running parts enclosed.					
RATE OF SPEED OR REVOLUTIONS.				300 to 1500	300 to 1500.	300 to 1200.
AIR COOLED.	Natural circulation.	Suction fan circulation.	Gear driven fan in front. Fly-wheel suction fan in rear.	FRANKLIN MOTOR-POWER.	42.	12.	20.
LUBRICATION.	Splash system; oil maintained at constant level in base by force-feed, sight feed, two-feed, adjustable-feed, lubricator on dash.	Splash system; oil maintained at constant level in base by force feed, sight feed, two-feed, adjustable-feed, lubricator on dash.	Splash system; oil maintained at constant level in base by force-feed, sight-feed, foot-feed, adjustable-feed, lubricator on dash.	RATIO OF REDUCTION FOR EACH.	High, 4-1. Low, 12-1. Reverse, 24-1.	High, 4½-1. Medium, 7¾-1. Low, 13½-1. Reverse, 15 -1.	High, 3½-1. Medium, 5½-1. Low, 11¼-1. Reverse, 13 -1.
				APPROXIMATE MAXIMUM SPEED	40 miles.	35 miles.	40 miles.
				APPROXIMATE TOTAL WEIGHT.	1120 lbs.	1300 lbs.	1800 lbs.

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Mechanical Briefs of 1906 Models

PACKARD "24"

THE new Packard "24" shows some radical changes. It is considerably larger, longer and stronger, with an increase of 35 to 40 per cent. in power over model "N."

The *motor* has four vertical cylinders cast in pairs, with integral water-jackets and valve chambers. It is made in France from stock the best adapted to cylinder construction, but the machine work is all done in the Packard factory. The bore is 4½ inches, and stroke 5½ inches, so that there is an increase in the piston area over the model "N" of more than 20 per cent., and represents an increase in motorpower of 35 to 40 per cent., with only 5 per cent. increase in weight. The pistons are fitted with four rings.

The valves on the "24," instead of being on one side only of the motor, as formerly, have been separated. The intake is on the right side of the cylinder, the exhaust on the left, permitting an increase in the size of the valves and valve chambers. This arrangement of the valves necessitates the use of two cam shafts, which are enclosed in the crank case, insuring perfect lubrication.

The *crank shaft* is nickel steel, heavier and stronger than in previous models of less motorpower, and the flywheel is larger.

The *transmission* has not been changed, except that it has been materially strengthened by an increase of gear face throughout, and by the application of Hess-Bright ball bearings, in place of the usual cone form. It is of the sliding-gear type, three speeds forward: 10, 25 and 40, and reverse. The change speed and reverse levers are at the right of the driver. Both the transmission and the differential gears are housed in one casing, always a distinctive Packard design, mechanically correct, and form a single unit at the rear axle, where the weight and strains should be carried, rather than on a light cross-member of the frame, the frame having enough to bear without these.

The *drive* is by shaft, and direct on the high speed.

For *ignition* an Eiseman high-tension magneto is used, although a storage battery is retained for the purpose of starting the motor from the seat, and is always in reserve. The magneto is bolted to the front arm of the motor support, and is operated by chain from a small countershaft, which is geared to the left cam shaft. The current is carried through a single high-tension coil on the dash to the commutator. In the same box with the magneto coil is a single coil, with vibrator, for the storage battery, magneto and "open." Individual switches connect with the stems of the spark plugs, so that a plug can be removed without disturbing the wires, or a fault in firing can be traced, by simply lifting one switch at a time.

The float-feed carburetor has been modified to meet the requirements of the larger motor. It is water-jacketed, to insure an even temperature of mixture under all conditions of weather. The regular air valve is controlled by lever on the dash, and is now fitted with new form of poppet auxiliary air valve. The connections with the cylinder inlets are very short, a single tube containing the throttle and two branch tubes to intake chambers.

A water governor takes the place of the usual counterweight form of governor for the automatic control of the throttle. It is operated by the water pump, which, being direct geared to the right-hand cam shaft, its action is always in definite relation to the speed of the motor. Any change in speed is immediately communicated to the diaphragm of the governor, and automatically adjusts the throttle.

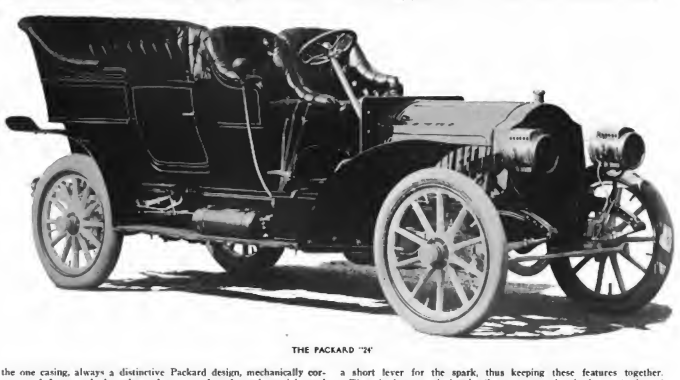
Splash lubrication is retained, the correct amount of oil being fed to the crank case by a force-feed plunger pump, operated by an eccentric and a worm gear on the commutator shaft. The pump has a single plunger and two leads, one for each compartment of the crank case, the lower half of which is cast with a solid wall, dividing the case laterally, at the center. The object of the wall is to secure an even level of oil under all four cylinders when taking a grade. The two oil tubes from the pump lead through a double sight-feed on the dash, so that the operator can see at a glance that each compartment is receiving its proper supply of lubricating oil.

The *crank case* is of aluminum. The upper section, which forms the cylinder support, is cast with a solid web between the arms, affording complete protection from dust, splash and gravel, and is a big improvement over the sheet metal pans usually used.

An expanding clutch is used having a leather face against the inner side of the flange integral with the flywheel. It is operated by a foot pedal and also by the emergency-brake lever, which locks it in disengagement when the brakes are engaged.

Constant circulation of the cooling water is secured by a gear-driven rotary pump and a tubular radiator, with sufficient capacity to make unnecessary an extra water-tank. The vane-fan is driven by a flat belt three-quarter inch in width.

The steering post carries a sector lever for throttle control, and also a short lever for the spark, thus keeping these features together. The wheels are 34 inches in diameter, 12 spokes in front wheels and 14 spokes in the rear wheels, with hubs of cast steel, fitted with 4-inch tires on front wheels and 4½ inches on rear.



THE PACKARD "24"

The frame is pressed steel, channel shaped, 5-16 inch thick, with a height of 4¾ inches, with cross members of the same material. Its length over all is 151 inches by 33½ inches wide in the rear and 28 inches wide in the front. The cross members have their ends turned at right angles, and the flanges on the side members are extended top and bottom, at every cross member junction, forming integral gussets, all secured by cold riveting. There are four semi-elliptical springs. This is a departure from previous models, where a single cross spring was used in front for a three-point suspension. The rear springs are 56 inches long, 2 inches wide, composed of six leaves. The front springs are 40 inches long, 2 inches wide, with six leaves.

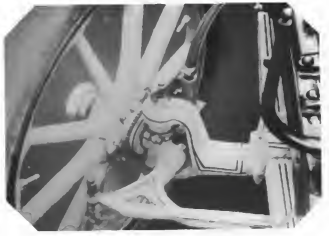
The *brakes*, four in number, are internal expanding, operated by foot pedal, and external clamping, operated by hand lever, on each rear wheel. The lever which operates the internal brakes also throws out the clutch when the brakes are set, and is held in place by a notched quadrant until released by hand. The construction of the brakes is such that they are thoroughly protected from dust without extra casings.

The *axles* have been strengthened throughout. The front axle is of cold-drawn steel tubing, with a drop in the center. The rear axle is also tubular, carried on double and triple ball bearings.

The long wheel base allows an extra roomy tonneau with 22-inch side doors. Distance from rear of front seat to front of rear seat is 37 inches. A locker has been placed in the tonneau close to the front seats,

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the lid of which is upholstered, and can be used as seat for two people. Another convenience is a brass footrail for the rear-seat passengers. It is supported by pivoted arms at both ends, and when not in use can be turned back under the rear seat. A slight backward curve is given the upper part of the rear seat, and while the front seats are straight, the upholstering is carried over the top in such a manner that a curve is produced and symmetry of lines retained. Additional storage room is provided under the rear seats, so that a large amount of luggage can be carried. Under the front seats is the gasoline tank, which has a capacity of twenty gallons. The upholstering is in Richelieu blue, over curled hair carefully packed in canvas forms, and backed throughout by spiral springs.

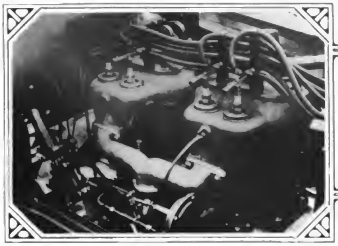


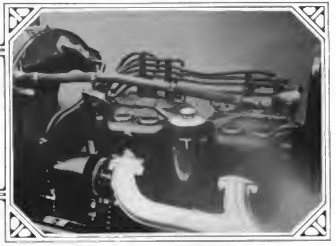
PACKARD STEERING KNUCKLE.

These springs are fastened together the same as a box mattress, with tempered steel rods on the outer edges, top and bottom.

SPECIFICATIONS — PACKARD "24"

Price, $4,000.00; body, aluminum; color, Richelieu blue; seating capacity, five persons; total weight, 2,700 pounds; wheel base, 119 inches; wheel tread, 56 inches; tire dimensions, front, 34 inches by 4 inches; tire dimensions, rear, 34 inches by 4½ inches; steering, irreversible worm and gear; brakes, four, an internal and external on each rear wheel; gasoline capacity, 20 gallons; frame, pressed steel, channel section; motorpower, 24 motorpower, at 700 revolutions per minute; number of cylinders, four; cylinders, arranged: vertical, cast in pairs; cooling, tubular radiator, with fan; ignition, jump spark and magneto; drive, shaft.





NEW TIRE TOOLS

MM. MICHELIN & CIE. have recently put upon the market a new set of tools for quickly and easily mounting and dismounting pneumatic tires, and which, along with a book of directions for use, are enclosed in a kit made of canvas. Of these tools, the most interesting are a jointed lever and a straight lever with a head beveled off at one side.

The jointed lever (Fig. 1) consists (1) of a bent piece, *A*, strengthened at the sides and terminating in a hook at one of its extremities.

(2) Of a piece, *B*, in the form of the cock of a gun, provided with a screw with a milled head, and capable of revolving around a tubular piece that slides into the interior of the piece *A*. This tubular piece is operatively connected with the latter by means of a screw, *D*, with a milled head. It is provided with three apertures that permit of securing it at as many different points, and to each of these apertures corresponds one of the figures—90, 105, 120—that are set into a small recess, *H*, formed in the piece *A*.

(3) Of a piece, *C*, beveled off at one of its extremities and provided at the other with a socket, into which it enters, and is secured by a screw, *E*, a tubular piece serving as a support to the piece *B*. The two screws, *D* and *E*, are connected by a small safety chain. The straight lever (Fig. 2) is beveled off at one end and surmounted at the other by a head beveled at one side and curved at the other.



Fig. 1.



Fig. 2.

In order to explain the method of using these two new tools, we illustrate the operation of mounting a tire after the safety bolts have been put in place, the air chamber has been laid flat, and the valve has been introduced into the aperture of the felly (Fig. 3). After the air chamber has been introduced into the felly and inflated the operation of putting the cover in place is begun. To do this (Fig. 4), the jointed lever, after having been regulated to the diameter of the tire, is introduced between two of the spokes in such a way as to engage with the inner side of the felly. Upon then moving the lever upwardly the cover will rest upon the piece *B*. Upon continuing the upward motion (Fig. 5), the projecting screw of this piece will be arrested by the felly and cause the piece to turn over in the latter in carrying the cover with it.

The straight lever having been placed in position in order to prevent the cover from coming off, the jointed lever is placed 12 inches further along, and the part of the cover comprised between the levers will then enter the felly. The hinged lever is then moved further and further along until the entire cover is in place.

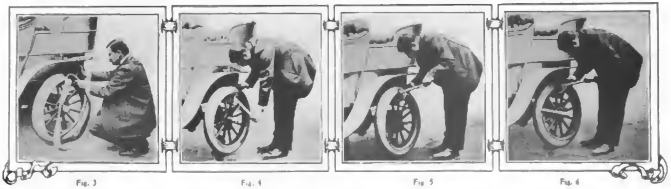


Fig. 3 Fig. 4 Fig. 5 Fig. 6

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Mechanical Briefs of 1906 Models

NEW COLUMBIA ELECTRIC BROUGHAM

COLUMBIA electric town carriages are used both in this country and Europe wherever vehicles of their class are in evidence. Few other electric vehicles have so high a reputation or so prominent a class of users. Many residents of New York and other large American cities who are especially well known because of their wealth and social standing, members of the English nobility and of the most exclusive Parisian circles ride in their private Columbia broughams, landaus, landaulets or hansoms.

It is now nearly three years since the Electric Vehicle Company brought out a distinctly new type of electric town carriage, and the introduction of the brougham, as herewith illustrated, will be regarded as an event of importance at this time in many centers of motor-car trade and interest, because this new vehicle is so great a departure from what has gone before in electric town carriages of the first class.

This new brougham follows general lines which, during the past year, have met with rapidly increasing favor in Paris and London because of its artistic design and electrical and mechanical equipment. It is much lighter than any electric brougham previously made in this country, and the construction throughout is adapted to the use of pneumatic tires, which, in combination with a special spring suspension, afford remarkably easy riding qualities.

With lightened construction, pressed steel frame, pneumatic tires, increased speed, improved control and steering and a more convenient and practical location of the driver's seat, the vehicle possesses many advantages over carriages of earlier styles, and with these more important new features are combined many minor improvements for further promoting the convenience and comfort of the occupants.

The inside seats accommodate four persons. The forward seats swing on hinges, and when not in use may be lowered, leaving the forward space clear. The standard trimming is in rich, dark green cloth or morocco. There are silk curtains, electric light, with dome fixture in the ceiling, controlled from the inside, driver's electric signal, speaking tube, card case, memorandum pad and a mirror placed in a convenient pocket, also toilet case and electric cigar lighter, if desired. To these accessories may be added electric foot warmers for winter and electric fans for summer.

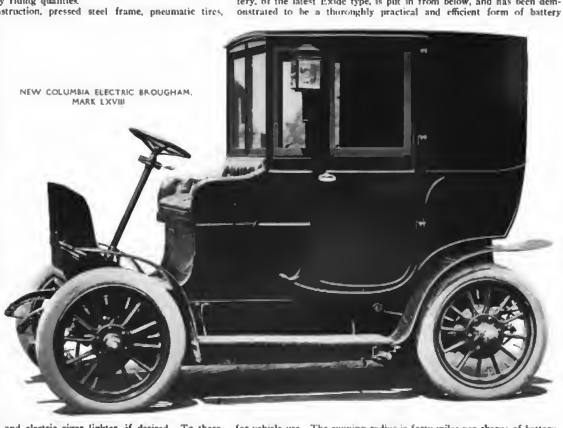
The most careful attention has been paid to the distribution of the constructive material used in the running and operating parts. Lightness has been obtained everywhere, but nowhere at the expense of strength.

The motor, of special design, is connected to the driving axle by double reduction gears of the noiseless "herring-bone" type and the brougham runs with a degree of silence never before reached by a carriage of its class.

There are five forward and three backward speeds with a maximum forward speed of 18 miles per hour, while the lowest speed is 4 miles per hour. The controller handle is placed on the steering column beneath the wheel, adjacent to the driver's left hand. An important advantage of the controller is its smoothness of operation. From a standstill full headway may be obtained without apparent definition between the separate speeds, as the lever is advanced through the series of five notches.

There are two powerful foot-operated brakes and a foot-operated cut-out safety switch, insuring absolute control under all conditions of crowded city traffic. Regular equipment includes electric side lights of the most approved pattern, electric alarm gong operated by a foot-push and a Weston combination volt-ammeter. The understung battery, of the latest Exide type, is put in from below, and has been demonstrated to be a thoroughly practical and efficient form of battery for vehicle use. The running radius is forty miles per charge of battery.

With the same chassis are supplied landaulet, hansom and victoria bodies.



NEW COLUMBIA ELECTRIC BROUGHAM, MARK LXVIII

DE DIETRICH TRAVELING CAR OF E. E. C. MATHIS, STRASBURG.



SENATOR CHAUNCEY M. DEPEW AND MRS. DEPEW A MOTORING





A PARISIAN MOTOR SPRINKLING WAGON IN THE PLACE VENDOME

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THE OXFORD

THE motor car industry is now so well established that the advent of a new company and a new car always arouses interest, not to say curiosity. A new car, the Oxford, named after its birthplace in Michigan, from the hands of Mr. W. H. Radford, M.E., and Mr. C. J. Smith, well known as a mechanical expert, has a pair of opposed cylinders 5x4½, developing 16 motorpower. The motor has a three-point support under the crank case, which is of aluminum built to support the cylinders at their centers. The pistons have three flat-lap eccentric rings, the crank shank being hand-forged with drop-forged connecting rods 9½ inches long from center to center.

The carburetter is of their own design of the float-feed automatic type, the connections from carburetter to engine being very short, so that the gas has very free entrance to the cylinders. The float-feed chamber is fitted with a supplementary valve with a spring and a needle valve located between the two chambers. A thermo-syphon cooling system is used in combination with a cellular radiator of their design, a vane fan assisting the cooling.

The cam motion is of such a nature as to give quick lifting and closing, the cam shaft being located at the top of the crank case, the cam rollers being of one-piece construction with the cam shaft. The valves are readily removed from the motor by removing two plugs and two pins. The valve ports are of generous size, being 1¾ inches in diameter, the valve stems being nickel drop forgings of one-piece construction.

Ignition is by jump spark and two dry batteries in connection with a double dashboard coil. The starting crank, which is permanently fixed to the frame, carries a device which relieves the compression in the cylinders when the crank is pushed in to start the motor, and which also closes the relief when the motor starts. Relief cocks are located one inch from the compression end of the piston stroke. These cocks are joined to a fork working against a collar, so that when the crank is pushed in the relief cocks open and are closed automatically by the withdrawal movement of the starting crank when the motor starts.

Lubrication is by means of an automatic oiler on top of the crank case, which drops oil on the cam shaft connecting rods and crank shaft. The universal joint is lubricated by means of a force feed grease cup. Transmission is of the individual clutch type so designed that when all gears are idle the motor is working on the direct drive, the transmission being connected to the motor by means of a sliding coupling of the Oldham type, the driving ribs being set at right angles to each other on the opposite sides of the bronze disk, the whole transmission being enclosed in an aluminum case and running in an oil bath.

Control is by means of a single side lever which operates the two forward speeds and reverse in a Y slot ratchet, but no two speeds can be thrown in at the same time. A change, however, can be made from any speed to one neutral point without passing through another speed, the gears always being in mesh.

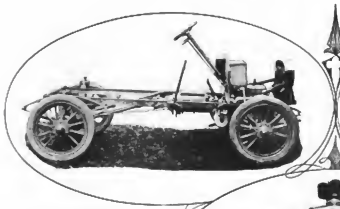
The frame is of pressed steel construction and carries semi-elliptical springs in front which are bolted to it. Full elliptical springs are used in the rear and held in place by radius rods, so that the springs ride very easily because they are free from all driving or breaking strains.

The wheels are all of 30-inch diameter and fitted with Timken roller bearings and 3½ inch Diamond tires.

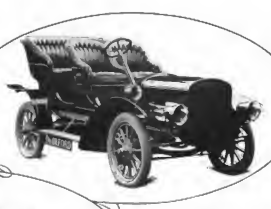
The brakes are of the internal expanding type, operated by the foot pedal under the steering column, and act on the rear wheel hubs, being fitted with internal leather-lined expanding brake bands.

The steering is through internal gear and pinion of a new type. At the bottom of the steering shaft is a spur pinion of 12 teeth, 8 pitch, which engages an internal spur gear on the driven end of the steering rod, the pinion and gear being adjusted by an eccentric bushing to take up all the lost motion between the steering gear and the steering arm, so that the control of the car is maintained by a very slight turning radius of the steering wheel.

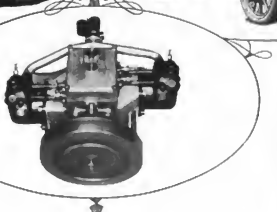
The spark advance is attached to the steering post directly under the wheel and consists of a small horizontal hand ratchet, the throttle control being similar but also connected by a plunger pedal on the footboard. The regular type of body is of the open-surrey style, with open seat in front and detachable rear seat, a spacious box being arranged to be put on in place of the rear seat for touring, so that then the car has the appearance of a runabout with plenty of room to store the necessary equipment for touring. An option, however, is offered consisting of a solid side entrance body with side doors. The gasoline capacity is estimated to be about equal to 200 miles on hard roads and is carried in a tank on the dashboard under the hood with a reserve tank under the driver's seat.



OXFORD CHASSIS



OXFORD CAR



OXFORD MOTOR

The first Oxford car produced has been on the road for the last three months, during which time it has been run over three thousand miles of Michigan's roughest roads, and with perfect satisfaction to its makers. The severe test to which this first Oxford product was put proving so successful, fully warrants the makers in carrying out the extensive plans which have been laid down. A stock of cars of the same model are in course of construction for early delivery. The plant is equipped with the latest improved automatic machinery, and special tools, affording every facility for rapidly and economically producing high-grade motor cars.

SPECIFICATIONS—OXFORD 16-MOTORPOWER

Price, $1,500; body, surrey or side door; color, royal blue; seating capacity, five persons; total weight, 1,500 pounds; wheel base, 90 inches; wheel tread, 56 inches; tire dimensions, front, 30 inches by 3½ inches; tire dimensions, rear, 30 inches by 3½ inches; steering, wheel; brakes, internal expanding in hubs; gasoline capacity, 8 gallons; frame, pressed steel; motorpower, 16; number of cylinders, 2; cylinders arranged, horizontal opposed; cooling, thermo-syphon; ignition, jump spark; drive, bevel gear; transmission, individual clutch; speeds, 2 forward, 1 reverse.



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Mechanical Briefs of 1906 Models

THE NEW HAYNES

ELMER HAYNES, one of the pioneers and pillars of the motor-car industry, still has the pioneer bee in his bonnet, and so, to introduce it, he sends his new model 50 motor-power car on a road tour from Kokomo to Toledo, Cleveland, Buffalo, Rochester, down to the main line of the New York Central to Albany, thence to Boston and the New England cities, New York, Philadelphia, Baltimore, Washington, and Pittsburg, and, if the weather permits, to the Pacific coast. The car is noticeable because it is an exact duplicate of the one that performed so well in the eliminating trials for a place on the American Vanderbilt team. The illustrations show both the exhaust and inlet sides of the motor, the inlet and exhaust valves being located on opposite sides. All the valves are operated mechanically and are interchangeable. The illustrations, however, show the exhaust bus pipes leading to the muffler removed.

The four cylinders are cast separately with integral water jacket, the bore and stroke being five inches by six inches. The cam rods and cams are enclosed and oiled by splash lubrication from the base. The reducing gears are also enclosed, and a sheet steel pan is fitted underneath the chassis extending rearward underneath the frame. A cellular radiator is used with a fan in rear of it, but in front of the engine. There is also a fan in the fly-wheel in the rear of the engine with the radiator fan running on ball bearings and is belt-driven, the driving pulley being located on one of the reducing gear shafts. The fan in the fly-wheel runs in a direction opposite to the fan in the radiator, but both of them throw the air towards the rear of the car. The front fan sucks through the radiator and the rear fan drives it on through, merely serving to increase the volume of air that can pass through the radiator.



NEW 50 M P. HAYNES

The motor is bolted directly by its arms to the steel frame which is offset in the front and reinforced with wood throughout. Both the water pump and oil pump are gear-driven, the oiler being on the force feed system using individual pumps. Connected on the dash is an auxiliary pump for pumping oil into the crank case if needed.

The ignition is by jump spark with dry cells or storage batteries, the ignition and throttle being both controlled by levers on the steering wheel. The carburetor is an ingenious one designed by Mr. Frank Nutt and built in the Haynes works.

The commutator is also a new one and likewise designed by Mr. Nutt. The transmission is a three-speed forward and reverse sliding-gear type, with a special device which permits the operator to change from high to middle, and from middle to low speed without the necessity of releasing the master clutch, and without the possibility of burring or stripping the gears. The master clutch is made after the well-known principle of the Haynes individual clutch, having a very large drum keyed to the rear end of the crank shaft, while to the forward end of the transmission shaft is keyed a heavy band which revolves freely around this drum until constricted by means of a cam, controlled by a foot lever. The operation of this clutch enables the driver to pick up the speed of the car as gently as desired, and its construction is such that it is very accessible for any required adjustment, the Haynes Company, however, being unwilling to give any illustrations or further detailed description of this new construction and the earburetor and commutator at present.

The rear axle construction has the familiar sprocket and roller pinion which was so successfully used on the Haynes car during the current year.

Bevel gears were rejected in the Haynes for the three following good reasons:

First, the difficulties due to the long, thin teeth are avoided, greater strength is obtained and the danger due to teeth breaking are eliminated.

Second, by its action in motion two rollers are always engaged with the sprocket teeth and the new design of these teeth insures the perfect performance of their function with the rollers, so by this invention all thrust is eliminated.

Third, it combines the virtues of the chain-driven sprocket wheel and the bevel gears. Its great strength admits of staneher construction throughout, and it is absolutely silent in operation. Both sprocket and roller gear revolve in a dust-proof oil bath. Now the difficulty in all shaft-driven machines is owing to the inherent mechanical tendencies of the gear drive to separate or tear itself away, which has been the cause of frequent rupture or breaking of rear axle easings. Heavier easings have not always proven effective in preventing this. It has been noticed that when the driving shaft revolves to the left, driving the sprocket, its tendency is upward on the teeth of the sprocket carrying with it the axle easing. When the motion of the car is reversed, revolving the shaft to the right, it is also certain to force the easing in the opposite direction.

On the Haynes in order to prevent this is attached a stay bar. It is rigidly attached to the gear ease and projects upward through a square yoke between hardened rollers, so that while the lifting force exerts itself against the stay bar the body of the car still may rise and fall, the driving shaft being meanwhile held in perfect alignment.

A four-prong slip joint which operates in perfect connection with the universal joint near the rear axle is also provided. It consists of a flange, the hub of which is firmly keyed to the driving shaft. Four steel pins project from points near the circumference of the flange entering holes in the body of the universal joint.

All the wheels are 34 inches in diameter and fitted with 4-inch Diamond tires. The springs are 2½ inches by 42 inches front, and 2½x46 inches rear. The brakes are internal and external on the rear wheels. Steering is by gear, worm and sector, the steering rod being outside of and running longitudinally with the car. All the bearings in the car, excepting those used in the fans, which are ball-bearings, are roller-bearings, including the motor, the shaft and the wheel bearings.

The body is of the now accepted standard type of side entrance construction, but it is a noticeable fact, and one deserving to be recorded, that the Haynes company was the first company to introduce side entrance cars, their original surrey type of body of long ago being of this design, the foreign practice being simply to add only a pair of doors to it, which completed the idea.

This 50 motor-power car is the same in all respects as the Haynes racer, which won for itself a place among the first five in the eliminatory trials for the Vanderbilt Cup race. The Haynes Company stated, when they sent out their Vanderbilt Cup racer, that it was their new 1906 stock model, 50 motor-power car, and they said neither more nor less than the truth, as is evidenced by a comparison between the specifications and dimensions of the racing car and the new touring car as described.



INLET SIDE OF HAYNES MOTOR



OUTLET SIDE OF HAYNES MOTOR

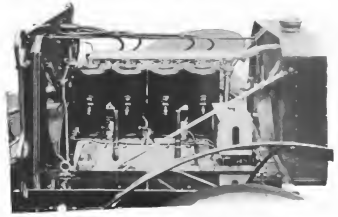
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Mechanical Briefs of 1906 Models

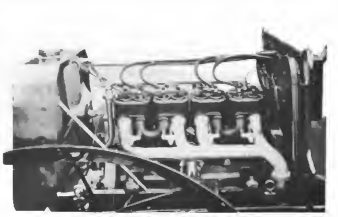
GROUT GASOLINE CAR

SINCE 1896, Grout Brothers Automobile Company, Orange, Mass., have manufactured the eminently successful Grout steam cars. During this time they have also constructed and experimented with many models of gasoline machines preparatory to the bringing out of this model, specifications of which are given herewith and which they list this season for the first time, claiming that, in its respective class, no finer or more carefully made, smoother running or efficient machine is possible to build.

Having recently secured the services of Mr. H. L. Radford, of Boston, Mass., a man with over twelve years' experience with the hydro-carbon (gasoline) motor, and employing skilled specialists throughout this department, using only the very best possible materials in their construction, they offer no experiment, but machines of proven worth, machines which simply must place the name of Grout among the leading makers of gasoline motor cars.



RIGHT HAND SIDE OF MOTOR

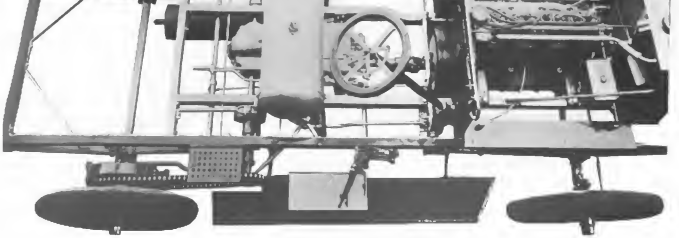


LEFT HAND SIDE OF MOTOR

The makers claim for the car simplicity in control, for instance the automatic oiling device for the engine with the splash lubricator, which is set at the factory and only needs to be filled to give perfect results. The throttle and spark devices are attached to the wheel and are stationary, not moving with the steering wheel. The commutator or distributer is stationary, thereby giving a chance to attach the wires permanently and without any danger of their breaking. Transmission is of extra heavy size, sliding gear type, running in oil, to a double chain drive. Solid axles are used front and rear. Car is geared for about thirty-five to forty miles an hour, and will take nearly all hills on the high speed.

Specifications Grout gasoline car: Motor, 4-cylinder, 4"x5, 28-30 h.m.p.; clutch, cone; transmission, sliding gear, three speeds forward, one reverse; drive, side chains; control, spark lever and throttle lever both on steering wheel; stationary, always in same position; cooling system, positive circulation radiator; ignition, high tension, one coil with distributor; oiling, mechanically operated oiler; it is non-adjustable, that is, set at factory and needs only to be supplied with oil; steering system, irreversible worm and section type, oil and dustproof; carburetter, float feed, automatic; wheel base, 96 inches; wheels, wood artillery, 30x3½ inches; springs, 42 inches; rear axle, solid, 1¾ inches square, nickel steel; front axle, solid, 1¾ inches square, nickel steel; gear ratios, 3 to 1; drive, by bevel gearing, two side chains; sprockets, front, 22 teeth; rear, 34 teeth; chains, ½x1 inch pitch; diameter of roll, ⅝ inch; gauge, 56 inch; speed, to thirty-five miles per hour; body side-door surrey; seats five; finish, Brewster green, yellow gear; upholstering, leather, waterproof; tank capacity, gasoline, 15 gallons; water, 8 gallons; oil, 2 quarts; brakes, on each rear wheel drum; length over all, 11 feet 10 inches; height, 5 feet 7 inches; width, 5 feet 5½ inches; equipment, two side oil lamps, horn and tube, complete tool kit, including tire-repair outfit; weight, 1,800 pounds; price, $1,800.

The side entrance surrey body is mounted on a frame of armored wood which is substantially built and well braced. The motor, which develops 28-30 motorpower, is of the four-cylinder, vertical type with the cylinders cast separately, cooled by means of forced ventilation and a large gear pump, which is driven directly from the half-time shaft, a cellular radiator being used. The valves, which are mechanically operated, are also interchangeable, the pistons being fitted with four eccentric rings, and lubricated by means of feed tubes running to the cylinders from the forced feed lubricator. The crank shaft is 1½ inches in diameter, with its five bearings babbitted in bronze boxes, one bearing at each end and three intermediate. The brackets supporting the crank case are on the upper part of the case, and by removing the bolts the lower part of the case may be dropped without removing the motor, so that easy inspection of the crank shaft, connecting rods and pistons may be had.



GROUT GASOLINE CAR CHASSIS—28-30 M. P.

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Motor Business Wagons

WHEN the motor business wagons were a novelty, naturally enough they were largely used for advertising purposes, but so many of them of all types are now in practical daily use, notably so the electrical ones, such as are turned out so largely by the Vehicle Equipment Company, that they do not attract the attention that they formerly did, because familiarity has bred content. Even the sigh-seeing coaches so largely used in New York and all other big cities, such as are produced by the Autocar Equipment Company, and vulgarly and slangily termed "rubber-neck coaches," while a great attraction to out-of-town visitors, do not possess the novelty for our urban residents that they did originally, which shows that anticipation, expectation and realization have met in the motor business wagon, and the result is profitable practicability.

In a purely pleasure vehicle, cost and maintenance do not largely figure, but the business motor wagon is a purely business proposition, and first cost, cost of operation, maintenance and depreciation must always be figured. Motor car repair shops and garages are now as plentiful as are blacksmith shops, wheelwrights', harness-makers' and veterinary surgeons'. Hence to the grocer, butcher and baker, the man who only uses one wagon and must keep it moving all the time, the bugaboo of repairs and lay-ups is not as formidable as it was a few years ago. Statistics are always interesting; hence a few figures of a recent event are appended.

Although not competing in the contest for the Glidden trophy, the baggage trucks furnished by the Knox and Packard companies were not the least interesting feature of the tour, as the summaries made in covering the thousand miles show. Besides all of this, both trucks participated in the Mt. Washington hill-climb in their classes, carrying full loads to the top, ascending and descending with ease.

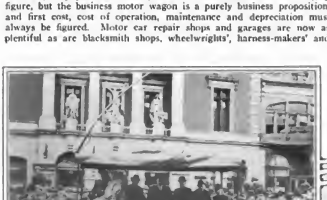
PACKARD TRUCK:

Total distance, 1,000 miles.	
Total running time, 95 hrs., 15 min.	
Average miles per hour, 12 (approx.).	
Total gasoline, 89 gals., at 20c	$17.80
Total lubricating oils, 2½ gals., at 50c	1.25
Total replacements (chain links) (estimated)	1.00
Total expense	$20.05

KNOX TRUCK:

Total distance, 1,011¼ miles.	
Total running time, 98 hrs., 35 min.	
Average miles per hour, 14⅝ miles.	
Total amount gasoline, 107¼ gals., at 20c	$21.45
Total amount lubricating oil, 4¼ gals., at 50c	2.13
Total replacements, 1 exhaust valve	3.00
Total expense	$26.58

The illustration of the four-wheel drive wagon shows exceptionally well the wooden disk wheels and the large carrying capacity of the vehicle. For a day's work for a Milwaukee brewery this truck did nearly the same amount of work as four two-horse teams did, at a total expense for the motor wagon of $2.15 for gasoline and 25 cents for lubricating oil. The load carried was fifty-four halves of beer, each weighing 190 pounds, a total of five and one-quarter tons. A large portion of the course covered was over improved roads and up some hills with a 7 to 8 per cent. grade. The brewing company figures that at this rate they will make a saving of at least $10 a day for each motor truck used.









The Logan truck, as used by the Depot Carriage and Baggage Company, of Kansas City, Mo., is noteworthy because its special point in construction is that at the back of the driver's seat there are eight feet of carrying space, which the illustration shows well filled by the vegetable packer's shipment. This one and one-half ton truck is fitted with a 30 motorpower two-cylinder horizontal-opposed motor 5½x6, placed well forward under the body, and uses a sliding gear transmission, being fitted in addition to the regular hub brake with a transmission brake. The frame is of angle steel 2½x1½ and ⅝ inch thick, the corners being securely braced with angles firmly riveted to the frame. The frame is also trussed with ⅝-inch rods running the full length of the frame, making what they call an equalized steel trussed frame. The steel axles, which are unusually heavy, are held in place by radius rods, the rear radius rods having turnbuckles with right and left hand screws for the adjustment of the chain. The front axle does not depend upon the springs entirely to hold it in place, but is also securely held by the front radius rods, the peculiarity of the radius rods' construction being that, owing

(Continued on page 110)

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MODERN MOTOR CARS
No. 4

DELAUNAY BELLEVILLE

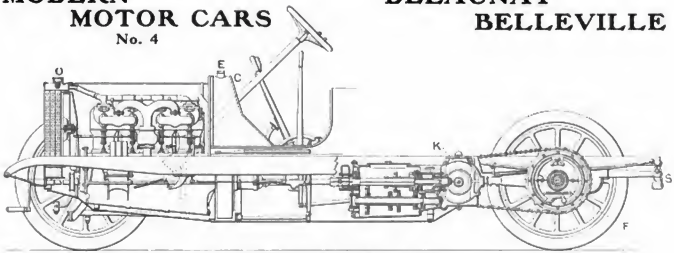


FIG. 1 DELAUNAY BELLEVILLE 40 M. P. CHASSIS
O. Radiator (water reservoir). E Gasoline tank. C Dash. K. Brake upon the shaft of the differential. F. Wheel brake. S. Transverse springs

THE stone wall of a prohibitory protective tariff prevents only the best of foreign cars being imported into the United States. Hence the advent of a new car, the Delaunay Belleville, the first importations of which are now arriving, is a matter of more than local interest, backed as the introduction is by its American sponsors, the Palais De L'Automobile, of Paris and New York.

The name of the Delaunay Belleville is so well known to the whole industrial world and is so familiar to the ears of our readers that we are certainly not introducing new comers into the motoring world. Is the expression "new comers," however, an accurate one here? Although the house of Delaunay Belleville is new to us as regards the motor car, it is none the less true that the large establishments of Saint Denis have had a long experience in the manufacture of the principal parts that constitute a motor car. Shall we mention the highly esteemed houses that for several years have had their cranks, their gearings and even their valves manufactured by Delannay Belleville? Probably it is not worth while. In constructing for others, the Delannay Belleville establishment asked itself last year why it should not construct for itself; and so it started in to gain new renown.

The most notable feature of the new car is evidently the lubrication. The motor, through the eccentric, actuates a pump under the hood which forces the oil into the pillow blocks, the crank bearings and the connecting rod head. The consequences are forced lubrication, perfect cleanliness, a saving in oil, and abolition of external lubricating parts. This system has been adapted for many years in all the steam motors employed in the French navy.

The other features peculiar to this new make of car are the ease with which all the parts may be inspected and the facility with which the body may be dismounted. In fact, there are but four bolts to be taken out in order to remove the body from the chassis; and there is no tubing and no driving gear whatever connected with the latter.

The Delannay Belleville works produce four cylinder motors only (types 16-20, 24-28 and 40-45). In the first, the transmission is by shaft drive, and in the two others by chain. The sole ambition that the house seems to have had up to the present is that it may be said that the mechanical parts of its cars are infallible. When these are closely examined, we may admit that there exist just as good, but certainly no better.

The cars bear one of the greatest names in French industry. They come into being with the weighty obligation to be equal to the renown of their family. They were introduced to the world for the first time last December, at the Paris *Salon*, where a crowd of visitors, charmed by their beauty, constantly hovered around them. Why should such a statement cause genuine pleasure? In the first place, because up to the present the potentates of the metallurgical industry who have engaged in motor car building and whose products, according to them, ought to eclipse all the stars that had already risen, have almost all of them reminded us that the heir to a great name and a large fortune is too often an ugly creature. Second, because these Delaunay Belleville cars please the taste. They seem wholly to respond to the ideal that may be formed of a French motor car.

A person even ignorant of things mechanical would be partienlarly pleased when he was told that the carriage work, which is usually riveted to the chassis and forms a wooden cover upon the mechanism, the complexity of which is appalling, is here fixed to the chassis by four simple bolts. There is no pipe, no wire, no attachment here to interfere with the manipulation of dismounting. If the weather is rainy and one should suddenly decide to use a closed body instead of a light, open, fair weather one, the change can be made in twenty minutes. If one was in distress upon the road and desired to get at some member of the chassis, the bolts may be removed in ten minutes, the body be shoved back upon the reaches, and the part heretofore easily accessible.

On another hand, witness the commotion that is generally caused by the restocking of a touring car. It is a scene to inspire a satirical pencil. The ladies, hampered by their furs or dusters, alight on the sidewalk, where the loungers form a circle and elbow them, and where the grocer's boy does battle with eans of gasoline that do not wish to have their necks wrung. And what do the ladies wait? Until the cushions npon which they were seated, and upon which they have left a handkerchief, a card, a pencil, a memorandum book, or what not, have been taken up by greasy hands and turned over that the chauffeur may find the plug of the reservoir concealed under the seats and empty three-quarters into the hole, one-quarter at the side, nf two eans, five eans, of ten cans! Oh, what dirty work for everybody. Here, on the contrary, the passengers do not have to get out nor even to bother with what is going on. The water is poured into the radiator in front of the motor, and the gasoline into the reservoir formed by the mud guard in the rear.

Again, take the vertical board that the driver of a motor car and his neighbor generally have in front of them. Is there really any great difference between such board, with its various apparatus, and the board on which the cook hangs his kitchen utensils? Oil and grease have free play thereon, and there is always a drop along a pipe waiting for a frock or a pair of trousers to come within reach of it. Here, on the

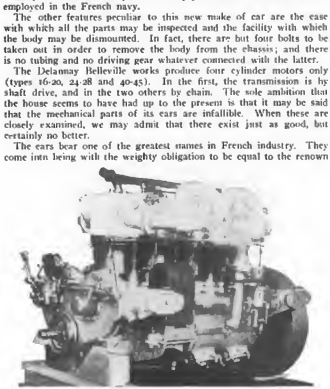


FIG. 2—DELAUNAY BELLEVILLE 40 M. P. MOTOR. VIEW ON ADMISSION SIDE
D. Plug. A. Aspiranon tubulures. B. Feeder containing the repulsing valve. F. Arm of the regulator. J. Control of the accelerator through a handle placed upon the steering hand wheel. K. Lever of advance to spacking controlled by handle on the steering hand wheel. Pi. Automatic belt stretcher. G. Pulley-of fan. S3. Two of the four interrupting rods for the ignition. I. Box of the flash. E. Additional air valves. U.U. Sight holes for connecting rod heads.

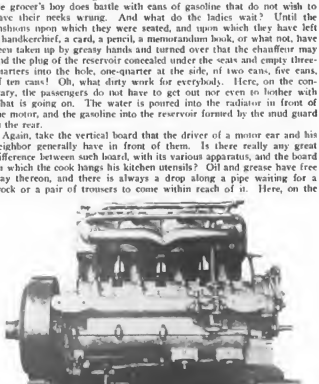


FIG. 3.—DELAUNAY BELLEVILLE 40 M. P. MOTOR. VIEW ON THE ESCAPEMENT SIDE
C. Current collector upon the igniters. U.U. Sight holes for the connecting rod heads W. Tubulures of escapement O. Waste pump. P. Oil pump. p Tube of oil pressure gauge M. Oil collector

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contrary, the dash-board disappears. To the driver and his guest, an inclined board which allows the pedals to pass presents its covering of very clean rubber; while from a board of varnished mahogany bordered with copper a small interrupter button projects between a water and an oil gauge. The water and oil circulate, but their presence and activity are no longer revealed save by two needles moving over a dial.

Although, perhaps, not very familiar with special mechanisms, one nevertheless observes in what an untidy state the under parts of a motor car are usually kept. Dirt and mud find a lodging place in the corners of cases and in the joints of the controlling mechanism, and the most scrupulous of employees lets his kerosene brush drop in despair before the daily tedious labor required to keep a motor car in perfect trim. A few manufacturers have begun to protect their mechanism with iron plates beneath, but they have stopped short, and shielded but half of it. Here, on the contrary, the bottom of the chassis is completely closed in front as well as behind by a covering of iron plate secured to it. Two doors closed by spring mechanisms, and jointed with leather in order to prevent any noise, permit of inspecting the parts underneath and of regulating the brakes, etc. The mechanism is thus kept perfectly clean, time is saved and wear is prevented, for dirt not only uses up the rags, sponges and brushes which are employed to combat it, but also the joints in which it lodges.

Let us remark, by the way, that this under part of the chassis, rounded in the centre and tapering in front and behind, reduces the resistance of the air to a minimum and diminishes to as great a degree as possible the clouds of dust that assail the rear of a motor car while running.

Thus, the Delaunay Belleville car is replete with practical details which bear testimony to the fact that it was planned by one well acquainted with the road and a close observer.

These are arguments that should have as much weight at present with an undecided person as a list of racing triumphs. If one is anything of a judge his indecision must give way before the irreproachable workmanship of all the parts of the car.

The Saint Denis establishments are equipped with entirely new tools of a capacity such that all the parts of the cars that they construct are manufactured on the spot, except, of course, special devices such as magnetos, pressure gauges, etc. The majority of readers will be surprised to learn that even the chasses properly so called are stamped out at the works. An exact interchangeability of the pieces, with the necessary consequence of a perfect system of verification of the smallest bolt is the inflexible rule of this establishment, and this entire city of metal is controlled by a master mind, which explains the causes of success of this new make of motor car.

The Delaunay Belleville works construct only vertical motors of four cylinders. This year, these are of three types: (1) A 16 motor-power (3.5-inch bore and 5-inch stroke), which gives really 26 motor-power and furnishes from 60 to 65 per cent. efficiency, and carries four persons in a light body.

(2) A 24 motor-power (4x5), which gives nearly 30 motor-power and furnishes about 75 per cent. efficiency.

(3) A 40 motor-power (5x5½), which gives nearly 62 motor-power and furnishes from 90 to 95 per cent. efficiency.

The general arrangements are analogous in the three types. In the lowest power type (16 motor-power), however, the drive is by a shaft with cardan joints, while in the two other models it is by chains.

Let us first examine the motor. The cylinders are separate and their two faces are symmetrical. Consequently one of the sides of the motor carries a shaft with eight cams, four of which control the suction and four the ignition by interruption. The other side carries a shaft with four cams, which control the escapement. The first cam shaft, through a special gearing, actuates a Simms-Bosch magneto; and the second drives the water circulation pump. A very simple and well-placed carbureter is supplied with hot air at the bottom, and cold air at the side, through the opening of an automatic valve. A ball governor enclosed in a case, like all the distribution, displaces in the central feeder, B (Fig. 2) a valve, of which the form is so calculated as to allow the current of aspired gas to advance gradually and thereby permit of an effect of augmentation or diminution in all the notches of the toothed sector of the steering hand wheel upon which the handle that controls the gas is displaced. The peculiar conical form here given to the admission valve of the carburetor, which is certainly neither complicated nor revolutionary, and which renders the motor very flexible, demonstrates once again that it is to the improvement of details that the intelligent manufacturer ought to devote himself.

But most interesting is the Delaunay Belleville system of lubrication. All other cylinder-fired gasoline motors are lubricated by what are called external lubrication. The connecting rod head strikes the oil lying in the case, and throws the liquid in all directions, and the lubricator sends the jets of oil upon the parts in motion, etc. The liquid covers the piece, and then, through appropriate orifices, enters it, spreads along the pillar block through oil grooves, and is often aided in its motion by centrifugal force.

In the Delaunay Belleville, on the contrary, the lubrication is internal. The members of the motor are hollow, and are provided with "arteries" in which the oil circulates, not by virtue of its weight or centrifugal force, but because a "heart" actuates the circulation, because a pump sucks up the oil and forces it constantly into the conduits. The oil is thus sucked into the lower part of the motor and forced not only into the crank bearings, but into the crank itself, and not only into the connecting rod heads, but into the connecting rods themselves. The system is, however, new only in motor cars. Patented by the house of Delaunay Belleville in 1879, it was applied by it to several hundred steam engines of from 10 to 6,800 motor-power.

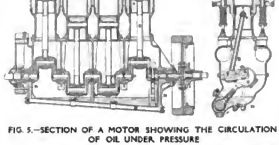


FIG. 5.—SECTION OF A MOTOR SHOWING THE CIRCULATION OF OIL UNDER PRESSURE

M, Collector. N, Branchings. EE, Part of the motor shaft. S', Shaft for the mounting of the clutch. S, Socket of clutch cone. B, Connecting rod. E, Motor shaft. T, Head of connecting rod. D, Eccentrics. a b, a c, Orifices in the crank. c, Channel. d, Orifice that leaks the oil to the connecting rod. V, Orifices through which the oil enters the branchings of the crank

One of the accompanying figures (Fig. 4) explains diagrammatically the operation of the motive part of the circulation of oil. Upon the extremity of the crank E there is mounted an eccentric which is operatively connected with a plunger piston without a stuffing box. This piston is enclosed in a cylinder, which, through an expansion, embraces, beneath, a fixed core of steel provided with two notches, *a* and *r*. It will be seen that when the connecting rod B, mounted upon the journal T, moves around the crank E, the eccentric D will not only rise and descend, but also move laterally to an extent equal to the distance that separates its centre from the point E. The result will be that the piston P will ascend to the same extent (in sucking) and descend (in forcing) in its cylinder, and cause the latter to oscillate around the fixed core *a r*. There will, therefore, be two positions for the whole; one in which the piston will be at the end of its downward stroke, and will begin to suck at the precise moment at which the cylinder, totally turned toward the left, will uncover the notch *a* which puts in communication the oil into which apparatus plunges and the interior of the cylinder. This will be the period of suction.

The other position is that in which the piston begins to descend—that is to say, to force the aspired oil, at the moment at which the swinging of the cylinder uncovers the notch *r* which puts the interior of the cylinder in communication with a collector M. This collector is a channel that extends obliquely under the motor and upon which are mounted three vertical branches, one of which extends to the central bearing of the crank, and the two others to the end bearings. The oil, therefore, reaches the crank through its three bearings.

(*Continued on page 76.*)

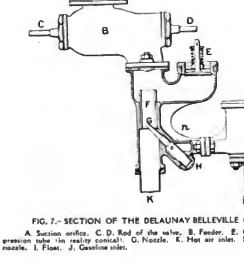


FIG. 7.—SECTION OF THE DELAUNAY BELLEVILLE CARBURETER

A, Suction orifice. C, D, Rod of the valve. B, Feeder. E, Cold air valve. F, Depression tube (in reality conical). G, Nozzle. K, Hot air inlet. H, Threaded end of the nozzle. I, Float. J, Gasoline inlet.

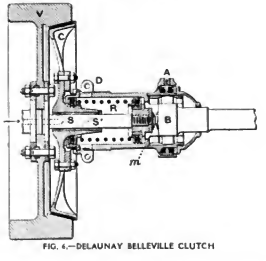


FIG. 4.—DELAUNAY BELLEVILLE CLUTCH

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MODERN MOTOR CARS

No. 5. PIERCE GREAT ARROW

DURING the coming year the George N. Pierce Company, of Great Arrow Glidden Trophy fame, will continue to make their 8-motorpower Stanhope runabout, but of course intend devoting most of their energies to the manufacture of their new models, the 4-cylinder 28-32-motorpower cars and 48-motorpower cars. The 28-32 has a cylinder 4¼ inches in diameter by 4¾ stroke; weight of car, complete, about 2,600 pounds. The 40-45 car has a cylinder 5 inches in diameter by 5½ inch stroke; weight of car, complete, 3,200 pounds. The following description of the 40-45 car applies generally in detail to the 28-32:

The Underframe.—This is of pressed-steel construction of from .20 to .30 earbon. It is 4½ inches deep at the center and tapers to 2⅞ inches at the ends. The flanges are 1⅝ inches wide and the thickness of metal is 3-16 inch. The three cross bars are of the same section as the side bars, which they connect, and to which they are riveted with large angle plates. In additon, there are special pressed-steel end pieces that serve not only to fill in the open channel where these extend beyond the end cross bars, but they very materially stiffen the ends of the frame. Two of the cross bars are located at the front and rear of the frame, respectively, and the third one midway between these, two longitudinal steel angle bars are riveted to the forward and center cross bars, forming a sub-frame for supporting the engine and transmission gear case. Semi-elliptic springs of extra length are used, the front springs being 40 inches long and the rear springs 54 inches. The front springs are shackled at their rear ends, the shackles being above the spring so as to work under compression instead of tension, bolted and brazed to the steering knuckles, giving great strength.

Notable are the type of ball joints for the steering-rod connections, with springs that effectually take up lost motion automatically. Wood artillery wheels are used, 36 inches in diameter, fitted with 4½-inch detachable tires in front and 5 inch on the rear.

The motor has four vertical cylinders, water cooled with mechanically operated inlet valves. The cylinders are cast separately and have a bore of 5 inches and a stroke of 5½ inches. The water jacket, valve chambers and cylinder-head are all cast integral with the cylinder proper. The cylinders are cast flat on one side in order to permit of bringing the cylinders closer together. At the same time a liberal water space is retained. The inlet valves are located on one side of the engine and the exhaust on the other. Both sets of valves are the same size, 1 15-16 inches in diameter, and are interchangeable. The caps over the valves are very easily taken out for inspecting and removing the valves by loosening a set-screw by one-quarter turn. The cover nut is a loose fit in its threaed and can be unscrewed by hand and then the cover lifted out, exposing the valve. There is an asbestos-filled copper gasket on the seat of the east-iron cap, insuring a perfectly tight joint. The valves have cast-iron heads, 45-degree seats and steel stems riveted, screwed and brazed into the heads. These are operated by two sets of cams on separate cam shafts, both located within the crank chambers. The half-speed pinion on the crank shaft meshes with an intermediate gear directly above it, and the latter with the gears on the two cam shafts, respectively. This arrangement does away with the large diameter gears otherwise necessary, reducing noise



PIERCE GREAT ARROW, 40-45 M.P. VICTORIA TONNEAU, CANOPY TOP, SEMI-ENCLOSED

This arrangement is adopted to prevent the possibility of the spring slipping under the shackles and thereby endangering the steering. The rear springs are positively connected to brackets in front and shackled at the rear ends.

The bodies are of a new design, as shown in the illustration. They are made almost wholly of cast aluminum, experience having shown that this is the best possible way of making a motor-car body. The front seats are of the individual type. The side entrance doors are extra wide. The rear seat is very ample for three passengers, with abundance of leg room, and space for carrying baggage and supplies. The dished front dash is made of cast aluminum with solid brass molding; two mahogany cabinets are provided in it for carrying small articles. The wheel base is 100 inches. The tread is standard.

The drive is by propeller shaft and bevel gears. A torsion rod is provided to take the reaction of the drive and the hub brakes. Rubber buffers are also provided to limit the deflection of the springs.

The front axle is a one-piece drop forging of heavy I-beam section. The axle, instead of having the usual drop in the center to clear the engine shaft, forms an inverted arch of very large radius, thus avoiding any sharp bends that would tend to weaken it. The steering knuckles are steel forgings of liberal dimensions. The steering pivots are of the Lemoine type, and are bushed with phosphor bronze. The spindles of the front axles, made of nickel steel, are fitted with hardened and ground tool-steel cones, the front wheels running on ball bearings. The spindles are bolted, and the steering cranks are keyed, and admitting of enclosing the gears in a compact case. The push rods operating the valves are fitted at the lower ends with hardened steel shoes of large size and moving in renewable bronze guides. The pistons are made very light and with webs to strengthen the wrist-pin lugs. They are fitted with four piston rings at the upper end. The wrist pins are of steel, case-hardened and ground, and are secured in the wrist-pin lugs by means of taper set-screws. The connecting rod is of the marine type, forged of steel and fitted with phosphor bronze bushes at both ends. The wrist-pin bearing is made extra long. The crank-pin gearing is adjustable for wear. The crank shaft is a solid steel forging with all the bearings accurately ground. It is supported in three bearings, which are provided with adjustable bronze bushes. Both the crank-pin journals and the main crank-shaft journals are 1 13-16 inches in diameter, and of liberal length to insure cool running and long wear. The crank case is cast of an aluminum alloy in two halves, being divided in a horizontal plane through the center of the crank shaft. All the crank bearings are entirely supported by the upper half of the casing, and the lower half acts only as a dust-cover and an oil-well. When the latter is removed free access is obtained to all the crank bearings for inspection and adjustment. The cam shaft gears are located at the forward end of the motor outside the crank case and protected by a special oil-tight cover bolted to the crank case.

Lubrication is effected by means of a gear oil pump located on the exhaust side of the motor and operated by worm gearing on the cam shaft. This pump draws the oil from the pit in the crank-case and

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forces it into the reservoir at the right side of the motor. From the reservoir a copper pipe leads to each of the three crank-shaft bearings. There is a removable wire gauze screen in each of these pipes. The crank-shaft journal and the short arms of the crank are drilled through their centers, the crank shaft being provided with radial holes at the centre of the journals, so as to provide a passage for the oil from the main journal bearings to the crank-pin bearings. There is, therefore, a continuous flow of oil from the reservoir to all the bearings of the crank shaft, the oil being carried from the main journals to these crank-pin journals by centrifugal force. The oil that works through the outer crank-shaft bearings returns to the bottom of the crank-case, at the end wall of the casing projects beyond these bearings. In cold weather the proximity of the oil reservoir to the cylinder insures the oil remaining in a fluid state. The shape of the oil tank has been altered, so that whether the car is going up hill or down, all the bearings get an equal amount of oil.

The commutator is of the roller type, and it is now placed on a vertical shaft between the third and fourth cylinders, so as to be readily accessible. This is worked by a pair of bevel gears from the inlet cam shaft.

The governor is of the centrifugal type, and in the 40-45 motor-power motor is placed on the crank shaft. It automatically controls the throttle valve leading from the carburetor to the motor inlet pipe. The lever that transmits the motion of the sleeve on the governor to the throttle valve acts against a spring, the tension of which can be altered at will by the upper regulating lever on the steering column. When the spring is compressed the motor will run faster, and when the spring tension is released the motor will run slower.

The water pump for the cooling system is of the rotary type. This gives a positive forced flow of water through the cylinder jackets. This pump in the 40-45 motorpower is attached to the crank case, being positively driven by means of a gear meshing into the exhaust cam-shaft gear-wheel. The pump takes its supply from the bottom of the radiator and delivers it into the water jacket of the motor at the lowest point thereof. From the top of the jackets the water returns to the top of the radiator. The fan behind the cooler is belt-driven from a pulley seeured to the forward end of the exhaust cam shaft.

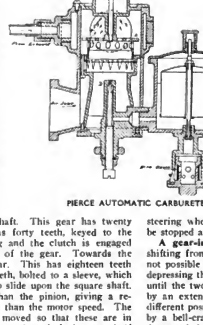
The tranamisalon gear runs on Hess-Bright bearings, and in of the direct-drive on the high-gear type, giving three forward speeds and one reverse. The motor flywheel is bored out to receive a cone eluteh, leather faced. It will be seen that when the clutch is in gear there is no thrust on any bearing. The clutch is released by pressing on the clutch foot-lever, which is connected to a collar which is fitted with ball bearings, thus compressing a spring, the thrust of which is taken by a ball-thrust bearing. On the end of the direct drive shaft is a gear with an extension upon which is a claw clutch having two fingers, which engage in slots in the hub of the friction clutch. This allows the friction clutch to be moved along the extension on which it rests when out of gear. The gear, when in position when the low gear is in operation, is free to revolve upon the shaft. This gear has twenty teeth. It meshes with a gear which has forty teeth, keyed to the shaft so that when the motor is running and the clutch is engaged the shaft will revolve at half the speed of the gear. Towards the other end of this shaft is keyed the gear. This has eighteen teeth and it meshes with a gear of thirty-two teeth, bolted to a sleeve, which has a square hole in it and can be made to slide upon the square shaft. This shaft will revolve t.77 times less than the pinion, giving a reduction on the low gear of 3.54 times less than the motor speed. The gears are equal, and when the sleeve is moved so that these are in mesh, the shaft will be driven at the same speed as shaft, i. *e.*, one-half the speed of the motor. This is the intermediate gear.

On the right-hand face of the gear are four projections which fit into recesses in the left-hand face of the gear, so that when the sleeve is moved on that these engage, the shaft will revolve at the same speed as the motor. This gives the high gear, which is direct from the motor to the propeller shaft. Although on this speed the shaft is revolving, it must be observed that it is only running at half the speed of the motor, and, being mounted on ball bearings, there is practically no loss of power. In practice, this shaft revolves perfectly silent. On the end of the shaft is keyed a gear which has fourteen teeth. This meshes with a gear below it. When the sleeve is moved to the extreme left the gear then engages with it. The shaft thus revolves in the opposite direction, giving the reverse, which is 4.56 times less than the motor. It will be noticed that the collar that moves the sleeve has ball bearings. Two of the gears are 6-pitch; the other gears are 5-pitch. The universal joint at the end of the transmission shaft is entirely closed in, a screw being provided for injecting oil and grease. This type of ball joint is used wherever possible in eases where a rod ha.. a direction of motion in more than one plane.

The chainleaa drive is provided with a live rear axle and a bevel gear drive. At each end of the propeller shaft is a universal joint. One part of the rear universal joint has a square hole in it and can slide upon the square portion of the shaft, thus allowing of the shortening of the longitudinal shaft when the springs are depressed. The differential gear is of the spur type, three pairs being used. These are enclosed together with the driving gear in a casing on the rear axle. The rear axle, made of nickel steel, is extra heavy and runs on large ball bearings. The thrust of this large bevel gear is taken by a separate ball bearing entirely independent of the driving axle bearings, so that it is impossible for the bevel gears to be drawn out of mesh by the wear and consequent adjustment of the driving axle bearings. These gears are hardened, and run in oil and grease.

The brakes.—Both the inside and the outside of the brake drums on the rear-wheel hubs are used for brakes. As the effective braking of a large car is of such vital importance it is necessary to have both the foot-brake and the emergency hand-brake operate on the rear-wheel hubs, thus getting directly to the most effectual place for the brakes without going through the transmission gear. The brake drum is very large in diameter. The hand-brake lever, which is on the right-hand side of the car, can be locked in any position, and operates on the external brake-shoes. These are of steel, lined with bronze rubbing strips, which can be readily replaced. These shoes are pivoted at their lower ends to a fixed support and their upper ends may be drawn together and the brake-shoes applied by means of the toggle arrangement shown. A coiled spring normally keeps both brake-shoes clear of the drum. A foot-brake pedal operates on the internal brake-shoes. These are also of steel with bronze linings. These shoes are pivoted at their lower ends and a cam at the upper end forces them apart when the foot-lever is depressed. A coiled spring normally keeps these shoes away from the interior of the drum. Both of these brakes operate equally in either direction, and the putting on of either brake first throws the friction eluteh out of gear, thus disconnecting the motor.

The steering gear is of large diameter, with hand-wheel on the top of a considerably inclined tubular, steering post. At the lower end of the shaft, to which the hand-wheel is attached, is a multiple threaded screw which runs between ball-thrust bearings. This screw actuates a nut with trunnions on it, upon which are die-blocks that slide within the jaws of a forked lever attached to a spindle. At the outer end of this spindle is a lever, which communicates the motion to the steering wheels. This makes practically an irreversible steering gear, so that no road vibration is felt in the hand-wheel. The cross steering-rod is behind the front axle. The steering column consists of three concentric tubes. The outer of these serves as a standard, or support; the second for changing the gear, and the inner one for steering. The gear lever works on a quadrant with notches for the different speeds, and, being directly under the operator's hand, it is impossible to make a mistake in engaging the desired speed. With this method of speed change free access is had to the driver's seat. There are also mounted on the steering column two small handles for operating the ignition timer and the governor. These can be operated without taking the hands from the steering-wheel. The gear-change-lever is held in notches by means of a spring. On the left-hand side of the steering wheel is a switch button, by means of which the motor can be stopped at a moment's notice.



PIERCE AUTOMATIC CARBURETER

A gear-interlocking device makes the stripping of the gears in shifting from one speed to another practically an impossibility, as it is not possible to move the gears until the friction clutch is released by depressing the clutch pedal, while it is not possible to engage the clutch until the two desired gears are in perfect mesh. This is accomplished by an extension of the gear-shifting rod having holes in it for the different positions of the gears. Into these holes drops a bolt connected by a bell-crank lever to the clutch, so that when the clutch pedal is depressed the clutch is thrown out of engagement and the bolt is withdrawn. Then the gear-shifting rod is free to be moved by means of the gear-changing lever. Should the pressure on this clutch pedal be released before the required gears are fully in mesh the bolt will bear upon the upper surface of the shifting-rod and will hold the clutch out of engagement until the gears have been moved into full mesh. When one of the holes in the shifting-rod comes opposite the bolt the latter drops in and allows the clutch to be engaged, and it is impossible to move the gear-changing lever until this bolt is withdrawn by depressing the clutch pedal and releasing the clutch.

About twenty gallons of gasoline are carried. This tank is under the front seat and is arranged to have a pressure feed, so that in mounting a steep hill the gasoline will at all times flow to the carbureter. This pressure is taken from the exhaust, and very special provision is made to insure that no dirt will get in; also that no excess pressure will accumulate in the tank.

A sheet-aluminum cover protects the underside of the motor and transmission gear. Push-pedals are provided for the clutch and foot-brake, these being more powerful than those used last year, which were pressed down.

The automatic carburetor, as illustrated, shows the latest patented form of this device. A jacket is provided around the mixing chamber which is in communication with the exhaust gas in cold weather, when

(Continued on page 78)

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Motor Mechanical Miscellany of New Practise, Patents and Perfection

EVERY owner of a motor car should understand that voltage represents electrical pressure, and amperes represent the quantity of the current contained in a battery. A close estimate of the capacity required in a fresh and efficient dry battery varies from 1¼ to 1½ volts and from to to 20 amperes, while some of the large dry batteries measure as high as from 20 to 25 amperes. Sometimes the spark from the igniting-coil is insufficient to ignite the compressed charge in the cylinders. Frequently the cause of the failure to ignite is a weak battery which lacks the necessary amount of volts and amperes. A handy tell-tale to indicate whether the batteries are efficient and fresh, or half dead, is a Robert volt-ammeter.

For a correct test press the spur on the lower part of the instrument securely into the metal connection of the carbon representing the positive, and the spur on the flexible cord to the zinc, or negative pole of the battery. The spurs on the volt-ammeter and the terminals of the battery to be tested must be clean. Very often readings of incorrect values are obtained, due to poor contact with the instrument, as well as to loose or corrosive metal parts of the battery. Do not connect the volt-ammeter to the battery longer than necessary for reading the test, as this will injure the battery.

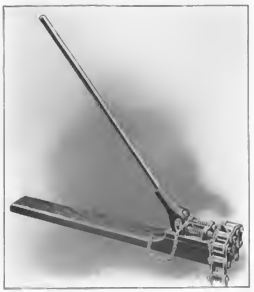
THE illustrations show the new repair outfit for the Whitney detachable chain. Every Whitney detachable roller chain contains one connecting link, which is distinguished from the others by notches in the top surface. This link fits loosely on the rivets and may be removed by hand with ease. All of the other detachable links, however, are purposely forced tightly on to the rivets, and some users have had some difficulty in removing them on this account. As the rivets are purposely made very hard, the ends will sometimes crack through the cotter-pin whole when a user undertakes to detach the chain by means of a hammer or wrench. The new device eliminates



WHITNEY CHAIN-REPAIR OUTFIT WITH HANDLE DETACHED FOR TOOL BOX

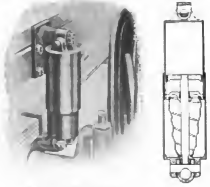
all such difficulties, and by means of same the links may be removed with the greatest of ease, and with no danger of damaging any of the parts. One illustration shows the device ready for operating, and the other shows it with the handle detached, so it may require but a small amount of room in the tool-box. The Whitney detachable chain is now extremely popular, having been adopted by many of the leading manufacturers; this new device will tend to make it still more favorable from the user's standpoint.

FROM time immemorial wheel vehicles have always needed something to ease the shocks and vibrations caused by running over rough roads. A thousand varieties of supplemental springs have been tried. Likewise rubber buffers and straps to keep the springs from breaking on the recoil, and friction devices to ease the springs up and down. A new one, the Kilgore air-cushion, seems to combine these three functions in one. It consists of a set of four cylinders with air-tight pistons. These are attached to each corner between the frame of the motor car and the axles. The cylinders are attached to the lowest point on the axles, and the pistons with the outer shell, which serve as dust-caps, are attached to the upper part of the frame by means of suitable brackets. The couplings between the cushions and the brackets are universal joints and permit of any amount of body swaying without throwing any of the body working parts out of alignment. When a car bumps into a rough place and the springs go down the cushion, while permitting the full elasticity of the spring, prevents a too sudden downward movement, but before the frame can strike the axle it is brought up quickly on the cushion of air without shock, so that the downward movement is made easy and stopped on the elastic air cushion before damage is done, while on the rebound, and just here is where springs are almost always broken, the movement is controlled; and, finally, if the rebound is severe, it gradually runs into an elastic cushion of air as it did on the bottom stroke.



WHITNEY CHAIN REPAIR OUTFIT READY FOR OPERATION

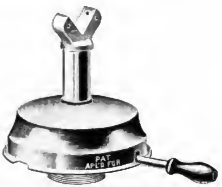
THE illustration shows the Dietz acetylene burner for use in Dietz oil side-lamps, the only ones that can be fitted with burners for use with acetylene gas. The change from oil to gas can be made very quickly. It is only necessary to remove the oil burner and attach the gas burner. The gas burner has the same general form as the oil burner and fits into the oil-pot in the same manner. The tube by which the gas is conveyed to the tip extends outside in the same manner as the button shaft of the oil burner by which the wick is raised and lowered. The rubber tubing from the generator is slipped over the tube on the burner, and the work of attaching the gas burners and connecting the tubing only requires but a moment. It is not necessary to remove the oil from the oil-pot, so that the change back to oil burning can be made instantly, merely reversing the above operation.



KILGORE AIR CUSHION



ROBERT VOLT AMMETER



DIETZ COMBINATION BURNER

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MOTOR CALENDAR

NOVEMBER

NOV. 14 to 18	Australian Reliability Trials
NOV. 17 to 25	Motor Show, Olympia, London, England
NOV. 17 to 25	Stanley Motor and Cycle Show

DECEMBER

DEC. 8 to 24	Paris Show

JANUARY, 1906

JAN. 13 to 20	Automobile Club of America, sixth annual motor car show at Sixty-ninth Regiment Armory, New York
JAN. 13 to 20	Association of Licensed Automobile Manufacturers, motor car show at Madison Square Garden, New York

FEBRUARY, 1906

JAN. 22 to 27	Ormond-Daytona, Fla.; annual beach speed contests
FEB. 3 to 10	Chicago; National Motor Car Show at Coliseum
FEB. 12 to 17	Detroit; Tri-State Motor Car and Sportsman's Show
FEB 20 to MAR 8	National Motor Boat and Sportsman's Show, New York

MARCH, 1906

MAR. 16 to 23	Boston Show

THE MADISON SQUARE GARDEN SHOW

All of the space on the ground floor, in the restaurant and basement of Madison Square Garden, have been allotted for the show of 1906. The spaces on the elevated platforms belong to the parts and accessory makers, and they, with the importers, will make their own allotment.

The first automobile show in this country was held in Madison Square Garden in November, 1900, under the auspices of the Automobile Club of America. In 1901 the second show was held in the Garden by the manufacturers—to be precise, it was held under the auspices of a committee named by the National Association of Automobile Manufacturers, on which the Madison Square Garden Company and the Automobile Club of America each had a representative. The succeeding shows of 1903, 1904 and 1905 were held under the same auspices.

For the show of 1906 in the Garden the desired results have been accomplished. It will be, for the first time, held under the auspices of the Association of Licensed Automobile Manufacturers, the show being sanctioned by the National Association of Automobile Manufacturers.

By a judicious selection of exhibits extreme congestion will be avoided. There will be not only room enough in the aisles for the comfort of the visitors, but room enough in the spaces, also, for their entertainment in a manner creditable to the industry.

The decorative work will be on a scale of magnificence hitherto unknown in this country, and the show will be made artistically and socially inviting to the most refined tastes of the patrons of motor vehicles. Decorating for all the exhibitors will be in charge of the show committee and will be done by one decorator in one scheme. One color, lighting, sign and decorative scheme will extend throughout the building. Exhibitors in the gallery and on the main floor will be treated alike with respect to decorations and electric signs. There will be no individual plans allowed to mar the unprecedented beauty of the show.

For the first time the show will be divided into departments. On the main floor will be pleasure vehicles of gasoline and steam motive power. Electric vehicles will be in the exhibition hall otherwise used as a café. Commercial vehicles will be in the basement. For tires, parts and accessories the concert hall and platforms above the floor will be used.

SIXTH ANNUAL AUTOMOBILE CLUB OF AMERICA SHOW

In order to avoid embarrassing several of its prominent exhibitors in relation to shows in other cities, the Automobile Club of America applied for and obtained from the N. A. A. M. a sanction for its Sixth Annual Exhibition, which this year will be held in the new 69th Regiment Armory on Lexington avenue, between Twenty-fifth and Twenty-sixth streets, New York City. Since the sanction did not interfere in any manner with the open character of the Automobile Club show, its exhibition committee having in view the general good of the industry, decided that it would be useless for the N. A. A. M. members to ask them to place themselves at bad standing with their own organization.

Applications for space in the spacious armory have been coming in at a substantial rate, and the division of prime authority on this is divided among the exhibitors according to the amount of rentals paid by each man to be responsible for the general representative character of the show.

All applications received by Secretary S. M. Butler, 253 Fifth avenue, up to noon Saturday, October 28, had equal consideration in the allotment of space. Later applicants will be given consideration after the first allotment has taken place. Associates and foreign cars will be placed in separate sections, and commercial vehicles when filling an entire space will be placed in the commercial-car sections of the building.

In its artistic details the club intends to make the affair superior to anything ever seen in this country, and the grand exhibition hall will make this possible. The decorations will be uniform and elaborate and will harmonize strongly into the whole scheme.

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THE CAR that won a victory over all cars costing from one to two thousand dollars in the "Climb to the Clouds" at Mt. Washington. Unlike some contestants, we did not have to send three cars to get one up, but sent the **SAME** car up **THREE TIMES.**

THE CAR whose regular stock R H. P. Runabout type won the race at Long Branch, August 19, making four miles in 5 min. 33 sec., and defeating cars limited at several times the price.

The automobile that has done these things MUST be worthy of your consideration. Look at as many cars as you please, but don't buy before seeing the Maxwell.

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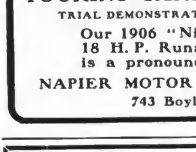
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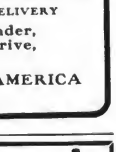
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Union Automobile Co., 4001 Olive St., St. Louis, Mo.

MODERN MOTOR CARS

(Continued from page 69.)

These bearings are each provided with a channel that receives the oil coming from the branches, and that constitutes a sort of liquid ring that constantly supplies the crank. In fact, the crank, which is hollow, is provided at the side, on a level with the channel of the bearing, an orifice which necessarily turns with it, but always remaining fed by this ring. The crank, in whatever position it may be, is thus filled and traversed by a current of oil. It passes the oil in its turn to the two bearings, which are not provided with a feeding branch, and to the four connecting rod heads. For this purpose it is provided, opposite the centre of each of these bearings, with an orifice through which the liquid makes its exit. The bearing is provided at the side with a circular channel and some oil grooves which lead the oil over its entire length. If it is a question of a connecting rod head, this is provided with an orifice through which it communicates with the hollow body of the connecting rod itself.

The circulation of oil in the motor is therefore wholly effected by the Delaunay Belleville forced system. The pressure is from 13 to 25 pounds to the square inch. Its object is to produce between two surfaces rolling one upon the other a permanent cushion of oil which isolates them from one another. The existence of this isolating layer is so real that an electric current of which one pole is placed upon the motor shaft and the other upon one of its bearings does not actuate an alarm as long as the motor is running, and consequently as long as the oil pump is operating.

The oil pump, which is provided with an easily dismountable filter, and a safety valve which prevents the pressure from ever exceeding 5.5 pounds, is connected on the one hand

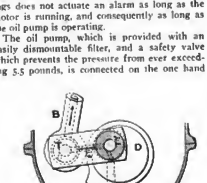


FIG. 4—DIAGRAM SHOWING THE OPERATION OF THE VALVELESS OSCILLATING PUMP

with a pressure gauge and on the other with an oil reservoir of from 8 to 10 quarts capacity, controlled by a pump actuated by a pedal. When the driver sees that the pressure is falling below 2½ pounds or thereabout, he presses upon the pedal in order to send some oil to the motor case and bring the pressure to the vicinity of 4.4 pounds.

The clutch of the Delaunay Belleville motors (Fig. 6) is remarkably simple. It consists of a leather-lined cone, C, mounted upon a shaft carried by the crank itself. It will be noticed that the circulation of oil under pressure reaches the socket upon which the cone is mounted through channels and the oil grooves, S S'. The shaft terminates in a large nut against which, through the intermedium of a ball-bearing, rests the clutch spring R, which, through its other extremity, bears against the cone. The spring presses against a stop fixed by means of an external regulating nut D to the box that contains the spring. If, therefore, this box be pulled backward by two parallel arms (not shown in the figure), the spring will be tightened and the cone loosened.

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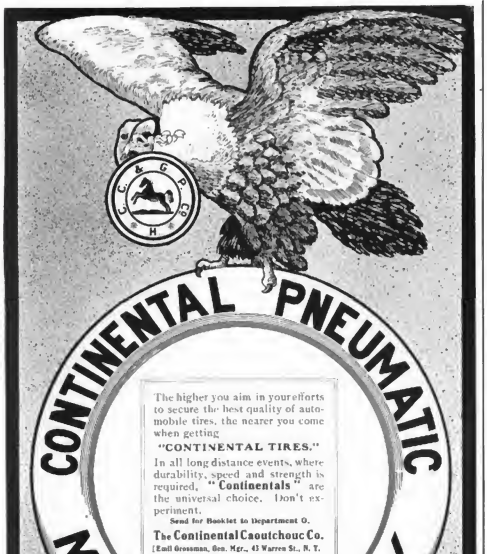
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MODERN MOTOR CARS

(Continued from page 71)

a portion of the exhaust is allowed to pass around the mixing chamber to prevent the vapor condensing on its way to the motor. The action of this carburetor is dependent upon the velocity of the air, due to the suction of the motor. When running slow the auxiliary air valve "A" is on its seat, being kept there by the spring, "B," above the dash-pot piston, "C." All the air then passes up the contracted passage, around the spray nozzle, "D," so inducing a maximum supply of gasoline considering the slow velocity of the air. As soon, however, as the speed of the motor increases, the velocity of the incoming air also increases, and so raises the perforated auxiliary valve, "A," overcoming the pressure of the spring, "B." The auxiliary ports surrounding this valve are thus uncovered and a portion of the air supply to the motor goes through these, mixing with the vapor and air that has come up around the spray nozzle. By correctly proportioning these parts, the carburetor will take care of the varying speed of the motor automatically. The dash-pot piston, "C," is provided to prevent too sudden fluctuation of the auxiliary valve, "A."

The ignition outfit consists of one 6-volt storage battery, and, as a reserve, a set of ten dry cells. These are coupled up so as to give seven volts. Five individual spark-coils are provided, with vibrators on each. One is a spare coil, so that if any one in use gets out of order it can be instantly replaced by the spare one while the motor is running.

THE RELATION OF WEIGHT AND POWER TO SIZES OF TIRES

NOTWITHSTANDING the few types of tires that are on the market the Examiners' Department in the Patent Office states that it would be almost a physical impossibility in the present state of the art to design a pneumatic tire that is wholly original in its construction. Notwithstanding this, hundreds of ideas regarding tire construction have been evolved in the last decade, and found their only use in the illustrations of the patents which were accorded them.

Air, as is well known, is one of the most elastic substances, and if a handful of air could be grasped and thrown on the rim of a motor car and covered with a sausage casing, that would be the ideal, academic tire, but not the practical one. It would be ideal, because the more air the tire has, and the less of covering of fabric and rubber, the more nearly it approaches to the natural air cushion; but, at the same time, such a tire would be wholly impractical, because if there is one place on a motor car that friction is needed it is in the tire in order to give traction and propulsion.

Anybody can build a non-puncturable tire, provided it is made heavy enough and contains enough fabric and rubber, but which will, of course, rob it of its life and resiliency. It is an axiom in tire construction that vibration should be intercepted at the best possible point, namely, at the point of contact between the tire and the ground, so that the vibration is not absorbed and distributed throughout the entire construction of the motor car. The air cushion of the tire being merely nature's spring which is always ready for use and which works without rubbing surfaces, for, when an obstruction is encountered, it sinks into the tire and the motor car rides over it without vibration or jolt being communicated to the car and its occupants. Its next best point of advantage is, of course, its speed. If the pneumatic tire did not absorb the shock of an obstruction the motion of the car would be retarded and more power would be required for a given speed. Indeed, if roads were ideal and perfectly smooth, why, a solid iron tire would be the best possible tire for use, which fact is demonstrated on our steam railroads with their steel rails and iron wheels, but our communer highways will never be ideally smooth. Hence, it is necessary to provide some sort of an elastic spring cushion to

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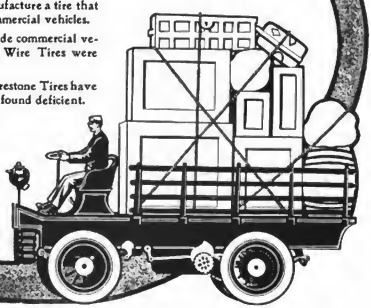
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obviate the shocks on rapidly moving vehicles passing over them. Such a shock absorber is the pneumatic tire, which has been described as being the great marvel of bicycle and motor-car making, both literally and figuratively, and the foundation upon which both these modern industries rest.

Indeed, at all times through the history of the art of vehicle construction, notably so in the bicycle and motor-car industry, distinct efforts have been made to decrease the vibration and increase the velocity, and none of these efforts have been successful, with the exception of the pneumatic tire. The pneumatic tire was invented late in 1888 by John Dunlop, a veterinary surgeon of Belfast, Ireland, for the relief of an invalid son, who used a tricycle in his perambulations, and to whom the excessive shock and vibration were painful.

The first American motor cars, which were of light construction, used what was known as hose-pipe or single-tube tires, a practice borrowed from bicycle construction. Abroad, a single-tube tire was rarely used, and double, or inner-tube tires of the clincher type, were in vogue from the first. The use of the single-tube tire in this country may now be said to be obsolete, the only tires used besides pneumatic tires being either solid or cushion tires, and these more largely for business use rather than for pleasure vehicles.

During the past season tire-making companies refused to guarantee tires of a certain size for use beyond a certain weight-carrying limit, and this good idea has now spread even among the users. Although the first cost is larger the final cost will be found to be less by using tires of a larger sectional diameter for a given weight and power.

A pneumatic tire has two prominent faults in its use. They are its tendency to skid and its liability to blow out, to say nothing of punctures, which are largely matter of luck. To avoid these two difficulties a new tire, called the Samson leather tire, "Type-Course," has been constructed. It is not unlike the ordinary Samson tire in appearance, though it is widely different and far superior. It is the outgrowth of the original Samson tire protector, which consisted of a belt of tanned chrome leather covered with metal studs having bifurcated ends, which were rivited and clinched to the leather tread, the whole afterwards being vulcanized to the tread of an ordinary tire. That protector saved many a tire of inferior quality, of course, but most tires were not made strong enough for the protector; hence, a wholly new tire was in order, and the result is the Samson leather tire, "Type Course," which has a greater durability than any other, yet the tire remains as resilient as if made of rubber alone instead of a combination of leather and rubber.

Mr. A. E. Gallien, the manager of the New York branch of the Samson Leather Tire Company, says that it is a daily occurrence to hear the following:

"'My tires blow out. My tires wear out too fast.' These are a few of the remarks that the tire manufacturers hear every day. Of course, tires of any make wear out fast, and even very fast, and there is no getting away from this fact. The tire manufacturer would be in the wrong to advise their customers to the contrary. The only thing to be done is to find a remedy.

"For a long time the Samson people have known the cause of the quick wearing out of tires; and that is because tires wear out fast simply because the manufacturers have not kept up with the many changes made in the motor car, and that tires are to-day built in practically the same way they were when first made, whereas, on the contrary, everything in the motor car has been changed and improved, but the tire remains primitive."

Asked if he believed that their "Type Course" was perfection his reply was: "Of course not, nor do we pretend having perfected a tire, but we do claim that our 'Type-Course' tire gives very much less trouble and wears better than any other tire made at the present time, and in the tire question the least bad is certainly the best."

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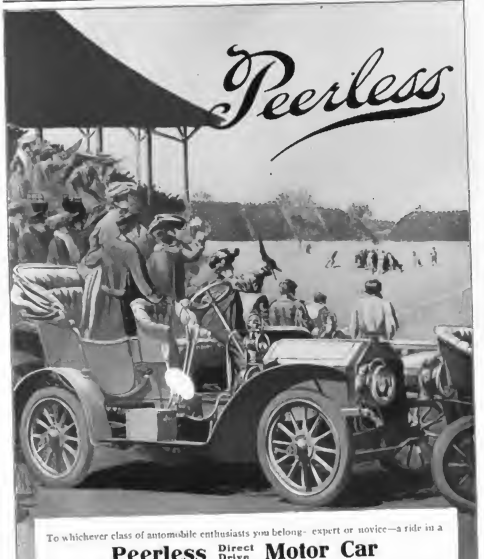
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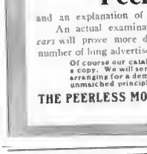
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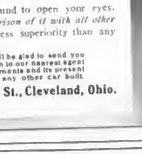


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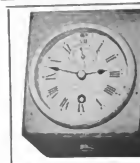
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PERFECT CONDITION IN SECOND HAND CARS

(Continued from page 46.)

and weaknesses of that particular car– all of which the other man had at his finger-tips—he may have enough real, earnest, old-fashioned trouble to lead him to forswear autos forever. Especially is this probable if he, a novice, makes the painfully common mistake of buying a second-hand touring car at the price he ought to pay for a good new runabout. Second-hand touring cars are bargains for the men who have learned to run them, but the average beginner is not in that class.

Now, having thus stated the facts with which we have to work, we may proceed to define "perfect condition" as found in the second-hand car. It is no secret that some cars are so badly designed and crudely built that they simply cannot be kept in order, even with the best of skill. Such cars are nothing but a source of exasperation and expense, and may as well be left out of the reckoning. They are technically sound when they leave the salesroom, but never afterward. To my mind, for a practical definition, a car deserves to be called in perfect condition *when it is in such shape as its owner would put it in if he intended to keep it instead of selling.* And, naturally, the owner, who knows his car, is much the best judge of its condition, though perhaps he is not the best person to report that condition to the buyer.

Although this definition falls considerably short of that which the inexperienced and hopeful buyer would be likely to frame, in that the said buyer would at first find a great difference between the service which he and the former owner could get out of the same car, still every owner will admit that few cars offered for sale live up to such a standard. It is human weakness, in fact, to shift the troubles to the next owner, and let the car which is soon to be sold fall into disrepair. Not only are small weaknesses coddled instead of "reformed altogether"– that may be the case even with the car in "perfect condition"– but things are allowed to work loose and stay loose, lost steel bolts are replaced with the rough and-ready "machine bolt," the brakes lose adjustment, and the bearings are suffered to wear to a detrimental extent. The tires, perhaps, are the principal sufferers, for a tire may hold together long after its strength has been permanently impaired by rim cutting, rotting of exposed fabric, and standing deflated when out of use. If the car has stood through the winter the matter is likely to be worse through neglect to lay up the car in such a manner as to protect it from rusting and other deterioration.

The foregoing remarks have been suggested by the writer's observation of the very frequent mistakes made by would-be motorists, many of whom fail altogether to understand that there is any difference between a new and a used car, other than in the appearance and the price, and who consequently insist on buying cars which by reason of their size, condition, complexity, or unusual or obsolete design, cannot possibly give satisfaction to them, though they might very well suit some one of more experience and a mechanical turn of mind. The morals which may be drawn are various, but may be summarized about as follows:

1. A car may be in good "running order" and yet fall considerably short of being in "perfect condition" as above defined. In all probability it does fall short, and the buyer will have to spend time and money to bring it up to the mark.

2. Even the best second-hand car will, till the buyer has "learned the combination," be more troublesome than a new car, and likewise more troublesome to its new owner than to the former owner, assuming, of course, that the former owner was competent. The most rigid inspection permissible before purchase will not disclose every form of wear and looseness, and the only thing to be done is to allow for them in estimating the outlay required. For his own peace of mind the new owner will prefer to eliminate numerous minor causes of uncertainty, as in ignition, tires, etc., which did not worry the former owner because he had learned to watch them.

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The Wayne Agency for 1906 is a good thing. The Wayne cars were extensively advertised last year in all the leading magazines and trade papers. For 1906 we have made arrangements for a campaign of co-operation with our local agents which will mean practical assistance in selling Wayne cars. We realize that to get good Agents it is necessary for the Agent to have a proposition on which he can make money, and the Wayne agency proposition is one which it will pay you to investigate.

The Wayne line for 1906 is comprised of cars that have proved their ability to stand hard usage by three years' road service.

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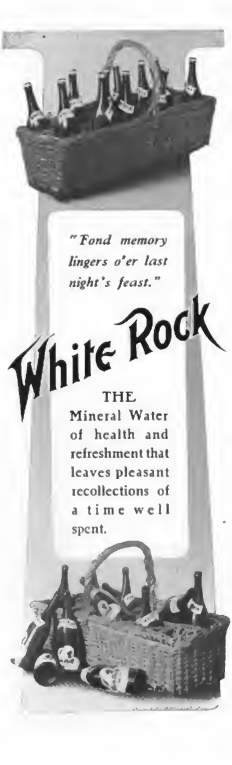
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3. The best time to buy a car is in the fall, when it is still fresh from service and has not had time to deteriorate by standing uncared for. The new owner will lay it up for the winter more carefully than the old, and the cost of storage ought to be met by a suitable allowance in the price.

4. Before a car is put into regular service it should be run for, say, a couple of days, or until all the weak points have had a chance to show themselves. The parts needing overhauling should then be attended to and a note made of the features likely to give minor trouble, so that the owner, being forewarned, may be forearmed. This will be found to save an immense amount of irritation and delay. If the buyer has time and some experience he may do this himself, but generally it is best done by a representative who understands that make of car.

It should never be forgotten that any car that has been used for a season will require something like a general overhauling at the end of it. The cost of this overhauling is seldom less than $100, even for a small car, unless it has had periodic replacements and refitting to keep it from getting run down; and for a touring car it may be four or five times that. Of course, if a car has been traded in to the manufacturers' agents in part payment for a new car, it has been overhauled by the agents or makers before being again offered for sale. But, even so, the overhauling given has covered only the machine shop items—possibly not all of those—and the buyer can count on an abundance of miscellaneous tinkering after he gets the car.

The time required for a complete overhauling—from two to six weeks—is another reason for buying in the fall, since if one waits till spring half the summer may slip away before he has got his car into such shape that he feels safe to take a tour. If an early start is made, on the other hand, one may pay a little more for the car, but he has a chance to get acquainted with it and can begin the new season with the satisfactory consciousness of knowing his machine and of having it in first-class order, ready to run till fall without delay.

NEW PRODUCTS FROM RUBBER

A CORRESPONDENT writing from England to the New York *India Rubber World* says that a French rubber company of some prominence has recently patented a machine whereby the canvas in old rubber is entirely separated from the rubber. The process is quite mechanical, no chemicals or heat being used. In these days of high prices for rubber scrap such a process is, of course, of more interest than in the old days one can remember, when it was customary to burn insertion under the factory boilers.

The same correspondent furnished the following paragraph describing a pneumatic bub:

"A good deal is being heard of the pneumatic hub which is to replace the ordinary rubber tire, with a great saving of rubber. I am told in one quarter that the idea is an old one, though it does not seem to have had much of a trial. Whether it is a novelty or not, a strong London syndicate is now engaged in developing it, and great results are expected. The claim is that by the fitting of a pneumatic cushion round the hub the same effect, as far as easy running is concerned, is obtained as in the case of the ordinary rubber tire encircling the rim."

A Cracked Porcelain.—Water splashed on a hot spark plug is likely to crack the porcelain. Lately I bounced my car through a mudhole, with the immediate result that one cylinder stopped working. I thought I knew what had happened, and, examining the plugs, wiped a splash of water from one of them. The car ran home, several miles, without trouble. The next day I had occasion to replace the old battery with fresh cells giving a much stronger current, and the same cylinder balked. The porcelain of that plug was cracked. I can only suppose that it cracked when it was splashed, but the weak current took the regular route while the stronger one found the crack.



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THESE strikingly original examples of an artistic revival are to be found in all sizes from the drinking mug to the imposing Loving Cup, the tall Tankard or the well-proportioned Flagon. The bodies are of heavy hand-worked leather, the linings of red copper, the mountings, including the shields for monograms, inscriptions or armorial bearings, of sterling silver.

BLACKJACKS are exclusively made by The Gorham Company at very moderate prices, from five dollars upward, and are to be obtained from the important jewelers throughout the country, as well as from the makers.

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The WATERS SPENT GAS BRAKE means to automobiling what the air brake meant to railroading—the maximum of perfect control.

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The same device blows a whistle, clear and strong, and also fills your tires.

And it does not disfigure the car.

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GAS ENGINE WHISTLE CO.
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CHICAGO REPRESENTATIVE
WM. R. JOHNSTON, 1336 Michigan Ave.

Write for Booklet No. 1, Brake; No. 2, Motor Boat Whistle; No. 3, Stationary Engine Whistle.

ADVENTURES IN MOTORLAND

By Helena Smith Dayton

THE Enthusiast suddenly found himself in a strange land. After driving for hours at high speed he had struck a wonderful stretch of road that made the miles seem inches. But now for the first time his surroundings claimed his attention. Though night had come on it was bright as day; the road gleamed phosphorescent and seemed to extend into eternity; the trees that lined this shining way were gemmed with searchlights, and on the branches, not trees, for, on close inspection, they proved to be rubber trees. It was evidently a country rich in minerals, for on the ground were all sorts of steel and iron tools used about a car. These were interesting, inasmuch as Nature herself had formed them. The Enthusiast filled his repair kit with one of each and was looking about for a pump when he ejaculated aloud:

"By the carburetor on my last year's car, this is a cinch! It must be Heaven."

"It's Motorland," corrected a voice almost at his elbow. He turned quickly to confront a figure equipped in motor togs that seemed to be a part of him—like the fur on an arctic animal.

"Never heard of it," said the Enthusiast, taking his Good Roads Map out of his pocket.

"You won't find it there," laughed the other. "Do you suppose we are going to give a good thing like this away and have the whole tribe of you motorists flocking here? No, siree! Why, you have to earn your right to come, just as you have to be good to go to Heaven."

"Oh," said the Enthusiast, highly flattered; "then I am here because I qualified!"

"On the contrary, you blundered in—and there is a severe penalty for that," said the native. "You haven't driven miles enough, and you have evidently broken the commandments of the road, which render you ineligible."

"What's the penalty for butting in?" demanded the Enthusiast.

"Death!" cheerfully answered his informant. "Wouldn't that puncture a tire!" exclaimed the unhappy man. "May I ask what method is used to short-circuit the victim?"

"Track racing," answered the Motorland citizen. "It's horrible and extreme, I grant you—but what's one to do? An example must be made or we should be over-run with outsiders!"

"But isn't there any loophole for me?" asked the alien. "You see, it puts me in a very embarrassing position, for I promised my wife I wouldn't go into track racing. I don't mind dying, but I hate to break my word."

"That does make it bad," said the other, sympathetically. "I might let you off on one condition—on account of the lady—though I tell you frankly it isn't regular. Of course, I needn't add that you are never to mention to a living soul of the existence of this place."

"Name the terms," said the Enthusiast, eagerly. "And may I suffer for gasoline if I ever tell!"

"Then you will give me an 'auto' graft," said the Motorman—if one might so designate him. "I'm a collector."

"Oh, I'm not a celebrity," said the Enthusiast, "but, if my autograph will do you any good, here goes," and he took out his fountain pen and tore a piece from an envelope.

"No, no!" cried the Motorman. "Not autograph, but 'auto' graft!"

"You'll have to show me," said the perplexed stranger in a strange tone.

"Come and see my collection," was the Motorman's proud answer to the challenge. They were soon speeding down the perfect road in the Motorman's car—the smoothest piece of mechanism the sun from the outside had ever seen. They dashed at lightning speed into the capital of Motorland, a pretentious town, which rendered the Enthusiast speechless with amazement at what he saw. In the centre of the square was a huge fountain, from which flowed the finest gasoline, which differed from the ordinary kind in that it had the perfume of rare flowers. It was noticeable that there were no sidewalks in this city, for no one walked. The national dress was motor togs. The stranger would have enjoyed examining each detail of the place, for it was all symbolic of



The "Breech-Block" Plug

The Plug With a Handle

To take out your *watch* or open a *Breech-Block* requires just the *same time, same tools, same effort*, and *one twist* cleans the *entire* porcelain to the whiteness of snow.

To remove the porcelain only, loosen the clamping nut and it *drops* out of its holder, and the gaskets of copper *drop* with it. No digging!

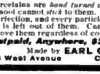
It is *nickeled* inside and out. *Highly polished* and *rust-proof*. Sparks between *two adjustable* points and not between *one* point and the *shell*. Its points are *protected*.

Porcelains are *hand turned* and so perfectly glazed that soot cannot *stick* to them. Their *threads* are cut to perfection, and every particle of the idea of cheapness is left out of them. Can you think of a way to improve them regardless of cost?

Postpaid, Anywhere, $2. Booklet Free.

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Not only affords protection from the sun and rain when raised, but makes a perfect dust shield when closed without making any wind resistance.

Manufactured by
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WE make the most complete Folding Automobile Top on the market at prices from $45 up. We also manufacture Dust Shields, Slip Covers, Storm Curtains, Engine Aprons and Tire Covers.

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PARIS AUTO TOP CO.
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The Motorist whose car is equipped with the

WEED CHAIN TIRE GRIP

doesn't care a snap about snow or ice or mud or sand, or steepest hills. Safe, easy travel under all circumstances are assured to users of this ingenious device.

Easily applied; requires but little car room; and the very moderate cost considering the great advantage.

"As necessary as another."

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One coil for any number of cylinders. Plugs, carburettors, coils, searchlights, cabin lights, batteries, anything and everything for your lighting and ignition

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WHICH ROAD WILL YOU TAKE



THE LONG WAY AROUND THE SHORT WAY OVER

Equip your car with a **Brennan Motor** and you won't have to take the long way around. We invite you to investigate our motors. It won't cost you anything. Hundreds of others have and they're all taking "the short way over," too. Read what one of the many satisfied users of **Brennan Motors** says:

BRENNAN MOTOR Co., Syracuse, N. Y. Stamford, N. Y., July 31, 1905.

Gentlemen:

We are pleased to say that the 14 H. P. motor which we purchased of you - because it is working fine. The Model of Thomas Car must or was put on weighs about 1800 lbs., and we have no trouble to get up nearly all hills at high speed, and every car I ever had on our grade for the very heaviest hills. Many cars will not climb our hills for compression of motor, but this car will climb all hills. I regret I did not purchase this motor of you before, as the last season makes it afraid of anything we have seen.

If it is any advantage to you to use this letter you are at liberty to do so.

Yours truly,

Name given on application.

BRENNAN MOTOR CO.

103 Grape St., Syracuse, N. Y.



Light Touring Car, $950. f.o.b. Detroit

A commercial traveler visited 125 towns in 32 days over the rough roads of Minnesota and North Dakota, using no other means of transportation than a

CADILLAC

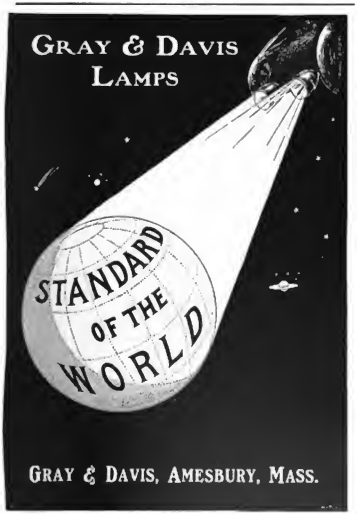
Isn't this rather interesting proof of Cadillac reliability?

Runabout, $750; Model C, with detachable tonneau, $850; Light Touring car, $950; Four-cylinder car, $2,800; f. o. b. Detroit

Write for Catalogue S, and address of nearest dealer, where you may see and try a Cadillac.

CADILLAC AUTOMOBILE CO., Detroit, Mich.

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Latest European Novelties

For Holiday Trade





WE are now importing a complete line of Mechanical Automobiles, including side entrance and rear entrance Touring Cars, Runabouts, Racing Cars, etc., which are mechanically operated with clock work and spring. Catalog mailed on request.

Automobile Jewelry

We are now handling a line of Automobile Jewelry, consisting of watch charms, watch fobs, ladies' hat pins; in sterling silver and rolled gold plate, designed and copied from automobiles and automobile parts, such as lamps, horns, wheels, etc. Catalog mailed on request.

No. 72 Fob
Neat leather strap and pad, mounted with Rose gold trimmings and automobile touring car.
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Cleveland

THE CAR OF SIMPLICITY



The First Automobile Contest

in which a CLEVELAND CAR has ever been entered was held under the auspices of the Los Angeles (Cal.) Examiner, August 5. The run from Los Angeles to Santa Barbara, Cal.—150 miles—was through a very mountainous section of the country.

¶ There were fifty-eight cars entered and the CLEVELAND CAR was one of the four cars that finished with a perfect score.

¶ The CLEVELAND—regular stock car—carried four passengers and was driven by the owner, Mr. Nat Myrick, who received a "first-class certificate" from the committee.

¶ The performance of the CLEVELAND on this occasion was no greater than any CLEVELAND CAR is capable of.

¶ Demonstrations gladly given by appointment.

BRING AN EXPERT WITH YOU

¶ Our catalog contains full descriptive and illustrated details—sent on request.

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NATIONAL MOTOR CARS

"Watch for the Round Radiator"



National Model C

24-30 H. P. Price $2500.00

4 cylinders 4¼ x 5

The Wonderful Hill Climber

Our Catalogue is Interesting

NATIONAL MOTOR VEHICLE CO.

1004 E. 22d Street, - Indianapolis, Ind.

Our 1905 Automatic Switch for Battery Charging



This has many improvements—two, waterproof; wiring so accessible by taking cover, window nuts—only 10. Can be removed by removing two screws, exposing all wires. Same Price as Heretofore.

THE SIMMS LAUNCH IGNITION & LIGHTING CO., Watkins, N. Y.

the great sport, but they had now stopped before the Royal Garage. The Motorman looted his horn loudly and a guard of Royal Mechanics issued from the palace and kow-towed low.

"Will your Highness have a new car?" asked the Captain of the Guard.

The Motorman, enjoying his companion's look of amazement, said quite simply, "Yes, I'm the real boy here." Then to the waiting official, "Bring me a model for 1950, or as much later as possible."

"A car for 1956 has just been completed, your Majesty," said the respectful underling. He blew three times on a whistle and a car finer than anything the Enthusiast had ever imagined was brought out of the Royal Motorcar Factory attached to the palace.

"I have to set the pace and keep ahead of the game or I'd be dethroned by a rival," said the Motorman. "Life isn't all lubricated even for one of my exalted rank. But that's neither here nor there—we will go and find some 'auto' grafts."

"I wish you would explain," said the mystified guest of royalty.

"Well then, here's an easy one. You get out, go around the corner to a small grocery and buy a pound of prunes. Wait there till I come, but don't let on you know me."

The Enthusiast followed these instructions, and he had just finished the transaction when the Motorman dashed up in his big car.

"One o' them rich autynoblists," said the clerk, winking.

"A pound of prunes," thundered the newcomer. As he went to pay for them the other stepped up indignantly.

"Look here," stormed the first purchaser of prunes, "he is soaking you. I paid just half that for mine."

"Yes, that's one form of auto graft," said the Motorman serenely.

The Enthusiast looked his disgust.

"How perfectly silly!" was his comment. "Is that the sort of article you are collecting?"

"It is my intention to include them in an 'exposure' for a magazine," said the Motorman, coldly. "Or I may write a book on the subject."

"Oh, I can give you dozens of them," said the Enthusiast. "Now that I think of it I've made quite a collection myself."

"If you've one that I haven't already you shall go free," said the Motorman. "Begin."

"Well—have you the man who is always wanting demonstrations simply to get a ride; who approaches the dealer for the second ride on the excuse that his wife wants to see if she likes it; the third time, that his father-in-law, who is going to buy the car, can see if he likes it, and who has no intention of buying any motor car?"

"Yes, and he visits each dealer in turn, getting a whole summer's fun at no expense. I've got him down fine. Continue."

"Have you the man, too stingy to buy a wheelbarrow, who induces his friend to buy a motor car, and uses his friend's car?" queried the Enthusiast.

"Yes, and I've also the smart physician who lets it get out among the agents that he is looking for a car and then calls for a demonstration every time he has a hurry case way out in the country. He works it on a regular system."

"I hadn't heard of that dodge," said the Enthusiast, "but I once had a chauffeur who put my car on the blink, persuaded me it was junk and then biased my decision in purchasing a new one. Of course, he had his idea of an 'auto' graft."

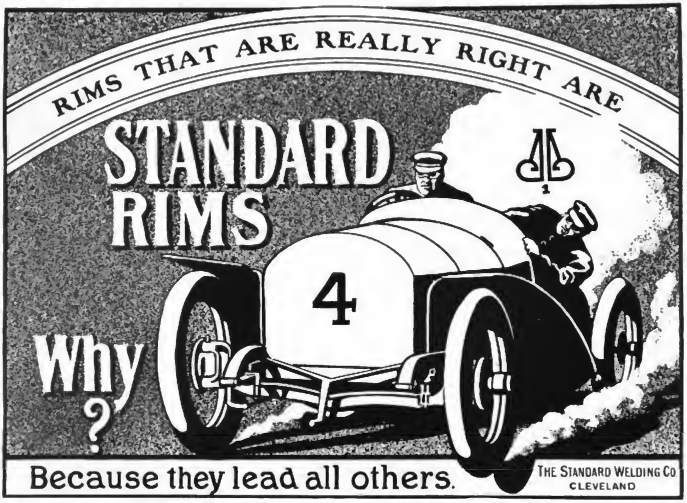
"He is the same kind that steers around a mile out of the way to get gasoline at a certain place. It isn't, of course, because the gasoline is superior!" The Motorman looked wise.

And though the Enthusiast racked his brains and mentioned grafts by the dozen—even to the man who never carries a repair kit and borrows of a passing motorist—still his life hung in the balance.

At last an idea struck him.

"There's one graft I work myself," he said, with returning confidence. "You see, my wife was very extravagant and her dressmaker's bills used to bowl me over. Well, I initiated

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THE AUTO-METER

"Built like a Chronometer"



TELLS THE SPEED OF TRAVEL
TELLS THE DISTANCE TRAVELED
Tells both with absolute accuracy

The *Speed Dial*, six inches wide and easily read, records the speed of a car from a fraction of a mile to sixty miles an hour and does it unerringly.

The *Trip Dial* records the distance traveled on a trip or for a day.

The *Season Dial* records the total distance covered in a season.

There is satisfaction in knowing how fast your car is traveling, satisfaction in knowing how far it has traveled.

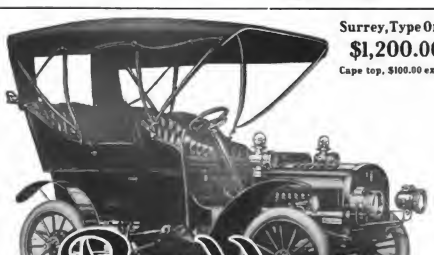
You enjoy this double satisfaction with an Auto-Meter on your car. Some one of your friends surely has one. Ask him about it.

In the meanwhile let us send you a catalogue and interesting pamphlet,—"Indisputable Evidence."

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Surrey, Type One,
$1,200.00
Cape top, $100.00 extra.

Rambler

Chain Transmission

carries every ounce of power the engine generates direct to the rear axle, without loss.

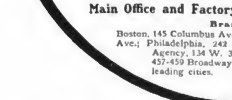
This full utilizing of power makes the Rambler the car to drive over country roads in all kinds of weather. The simple construction of every Rambler part insures ease of operation and dependable service.

Write for the Rambler catalogue, it gives the many reasons why the Rambler is the car for you to buy.



Surrey, Type One, illustrated above, complete with lamps, tools, etc., $1,200.00. Cape top $100.00 extra. Other models, $650.00 to $3,000.00.

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Cape Cart Tops, Extension Tops
Canopy Tops, Victoria Tops
Made Quickly, Made Perfectly
Delivered day promised
Send for Samples and Prices
Automobile Top Mfg. Co., 35 W. 43rd Street NEW YORK CITY



NEW LOCATION
AMERICAN COIL COMPANY
Formerly of West Somerville, Mass., have removed to their new factory at
FOXBORO MASS.
Write for Catalog, showing our complete line of high grade Jump Spark Ignition Apparatus.
Pacific Coast Branch, 306 McAllister St., San Francisco, Cal.



NEW MOTORS FOR OLD
If you suffer from inadequate power or other troubles, let us sell you a fine new motor, and make allowance for your old one. We have hundreds of customers buying both new and second hand and carry a fine assortment from 4 to 30 H. P. for automobile and marine purposes. Our general catalogue of gears, hubs, axles, wheels, tires and muffles for every purpose is well for you to have and is FREE. Ask for discount sheet as we make prices that are RIGHT.
NEUSTADT AUTO AND SUPPLY CO.
826-28-30 South 18th Street : : : : ST. LOUIS, MO.

her into the joys of motoring, bought her a car which she learned to run herself, and now she just lives in her motor outfit, a nifty but durable one, and is altogether too busy and happy to attend bargain sales. She——"

But Motorland and the "auto"-graft collector had vanished. The Enthusiast was alone upon a pleasant country road a few miles from his own country place.

"I'd like to know what he thought of that story," he said, regretfully. "But it evidently did the business!"

THERE ARE OTHERS

THE police of some American cities have been held up to opprobrium for the uniformity with which their evidence dovetails in support of another member of the force, but they are mere innocent "babes in the wood" to their English confreres, of whom we hear laudation, often *ad nauseam*. If there are doubters of this, let them master the few following court-proven facts. A motorist was charged by the chief constable with furious driving, and on his unsupported testimony convicted. As a matter of fact the motorist had, on the street where the furious driving was supposed to have taken place, stopped once at the post-office to mail letters, and twice to ask policemen the direction he was to take. Neither of these policemen was called before the magistrate. The motorist, after his conviction, found them both, and appealed the case. The following cross-examination, at the appeal, tells its own story, and the moral:

Q.—You, as a constable, thought it was your duty to keep out of this case?

A.—Yes, sir; for the prosecution.

Q.—Is that your idea of fair play as a constable?

A.—It is my idea of duty to my superior officer.

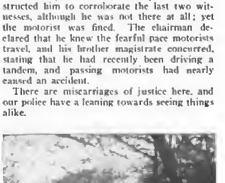
Q.—Is that your idea of what is just?

A.—It is, sir!

It is needless to say that the conviction was quashed, with costs against the police.

And lest this should be considered an isolated example, take another English case occurring in the same week, in another district. A motorist was charged with driving to the common danger. The policeman at point A swore that he timed the motorist at the beginning of the distance; policeman at B testified that he timed the car at the finish; policeman at C swore, corroborating the two previous witnesses in every detail, as to the time of starting from point A, and passing point B. He was on the horns of a dilemma when the defense pointed out that even a policeman could not be at two opposite points in space at the same time, and then being further pushed, he swore that the superintendent of the police had instructed him to corroborate the last two witnesses, although he was not there at all; yet the motorist was fined. The chairman declared that he knew the fearful pace motorists travel, and his brother magistrate concurred, stating that he had recently been driving a tandem, and passing motorists had nearly caused an accident.

There are miscarriages of justice here, and our police have a leaning towards seeing things alike.



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A FEW FACTS

Scott Muffler Co., Portsmouth, Ohio "Cincinnati, O., Aug. 29, '05

Gentlemen: I am more than pleased with your Mufflers. I have used one through the cool evenings and early mornings, and find it just the thing to prevent a stiff neck. Every Automobilist ought to have one, for it is the best thing in the market to-day.

Yours respectfully,
VAL. DUTTENHOFER, JR., Pres't.
The Cincinnati Automobile Club."

¶ The Scott Muffler positively MAKES ZERO WEATHER PLEASANT, because it combines three garments in one, and protects the Neck, Ears, Face and Chest against "Old Boreas."
¶ Solid and combination colors; plain and fancy weaves, from the very best worsted knitted fabric.
¶ Our illustrated booklet—in colors—tells all about them.
¶ Write us to-day.

The Scott Muffler Co. 13 Gallia St. Portsmouth, O.

A Muffler for Motor and Man

THE 1906 MODEL OF THE

Stevens-Duryea Touring Car

Will be the same as our 1905 model—
no more horse power, no less price.

We never were given to the idea of changing anyway. We think there are lots of people who are deferring the purchase of an automobile until there is less changing.

Anyway, what's the use of changing? We've got the fastest car of its size that ever happened. We've won every hill-climbing contest that we could get in. We are two years ahead of them all on Accessibility and Durability. We have solved the "tire problem," not to our satisfaction, but to the complete satisfaction of the users. We have a clutch that we don't believe will ever be improved upon. We produce more results with less weight, less parts, less pedals, levers, wires, pipes. We can shift gears without a sound; we can go slower on the high gear; we have easier springs, a wider door, more foot-room for the operator, better brakes, more clearance for rough roads, an aluminum body that doesn't open up in the joints, good dust-proof, double-acting brakes, a better weight distribution on tires than ever before attained, and a lot of other good things; so we have decided to rest on our laurels for the time being and devote our energies to the making of more cars and prompter deliveries.

SEND FOR DESCRIPTIVE MATTER

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MEMBERS ASSOCIATION LICENSED AUTOMOBILE MANUFACTURERS

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THE HATCHER AUTO-PARTS CO.

WE WILL PROVE

any and all automobile parts that we manufacture by allowing thirty days' trial; in fact we prefer to deal in this way with our customers.

¶ Our reputation for manufacturing reliable and practical automobile parts was established years ago, so that now our Guarantee means that everything we manufacture is as near perfect as science, material and skilled workmen can make them.

¶ Our carburetor is automatic and furnishes a perfect mixture at any speed; in all kinds of weather. They are made to fit any style engine.

¶ Our transmission has dust-proof bearings. Each bearing being oiled by rings from individual oil wells, being independent of gear bath oil well. With this combination any quality of oil can be used on gears without danger to the bearings. Three speeds forward and one reverse—made in various sizes. Arms made to fit any frame.

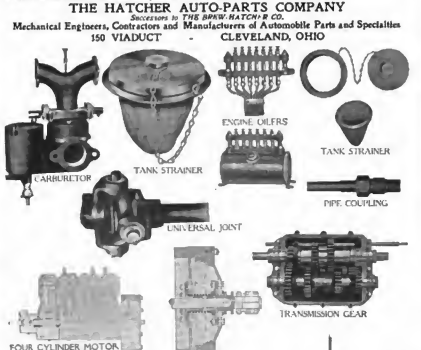
¶ Below are illustrated automobile parts we manufacture.

THE HATCHER AUTO-PARTS COMPANY

Successors to THE BROWN-HATCHER CO.

Mechanical Engineers, Contractors and Manufacturers of Automobile Parts and Specialties

150 VIADUCT - CLEVELAND, OHIO





CARRY AN EMERGENCY CASE WITH YOU!

You may need it. Our case contains all the necessary remedies and bandages, etc., together with full instructions.

Send a dollar for it.

U.S. EMERGENCY CASE CO

Utica, N. Y.

MORGAN & WRIGHT TIRES ARE GOOD TIRES

The MESINGER TIRE REPAIR BAND

This tire band is made of mineral chrome tanned leather, which wears like rubber, is tough, soft and pliable; water does not affect it.



Size,	2½	3	3½	4	4½	5
Price,	$1.00	1.25	1.50	1.75	2.00	2.25

We carry sufficient stock to fill orders promptly.

H. & F. MESINGER MFG. CO.

1801-1807 First Avenue NEW YORK



Auto Screw Jack

Powerful Ratchet Double-Acting Screw Jack

Easy to Operate Quickly Adjusted

No.	Weight Each	Lifting Capacity	Adjustment
501	6 lbs.	3,000 lbs.	11 to 19 in.
502	8 lbs.	4,000 lbs.	13 to 19 in.
503	12 lbs.	6,000 lbs.	14¾ to 23¾ in.

COVERT MFG. CO., - - Troy, N. Y.



The "M. & A." Knee Hamper

Myers & Alexander Manufacturers BUFFUM FIRE BARRETTS and HAMPERS, 220 E. 25th St., N. Y.

HAMPERS "THAT ARE DIFFERENT"

Cover and sides reinforced with our approved metal binding. A Hamper that will stand hard knocks. Write for pamphlet, containing illustration of full line.

"AEROS" PNEUMATIC SUSPENSION

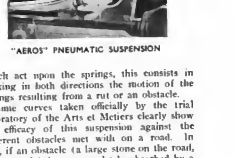
THE various establishments engaged in the manufacture of motor cars are daily endeavoring to make improvements in details, and, as one of the outcomes of this, we have the "Aeros" pneumatic suspension, which made its appearance about six months ago and has been highly commended for its efficiency and the ease with which it may be adapted to vehicles.

As its name indicates, the "Aeros," which is of rubber, is based upon the same principle as the pneumatic tire with which all motor cars are provided. It is designed to be placed at each of the four springs, and, as the accompanying illustration shows it, has the form of a sphere, of which the "poles," four inches in diameter, engage with aluminum sockets that operatively connect the apparatus with the axle and chassis.

The figure, furthermore, shows the constituent parts of an "Aeros" suspension, which, like a true pneumatic tire, comprises an air chamber and a cover; the aluminum socket with which the edges of the cover engage playing here the rôle of felly.

As it is designed to act as a brake against the oscillations of the springs, it is so placed that one of its extremities shall be operatively connected with the axle and the other with the chassis.

As for the rôle of the suspension, it will be seen that, contrary to that played by apparatus



"AEROS" PNEUMATIC SUSPENSION

which act upon the springs, this consists in braking in both directions the motion of the springs resulting from a rut or an obstacle.

Some curves taken officially by the trial laboratory of the Arts et Metiers clearly show the efficacy of this suspension against the different obstacles met with on a road. In fact, if an obstacle (a large stone on the road, for example) is not completely absorbed by a pneumatic tire, the wheel will undergo an ascensional motion with respect to the chassis, which will preserve the same relative position above the ground by reason of its inertia. In such a case, the "Aeros" becomes compressed and concurs with the tire in the absorption of the obstacle, and the wheel therefore neither jumps nor vibrates. After the obstacle is surmounted, the suspension resumes its normal spherical form, without elongation, and then effects a braking at the abrupt expansion of the spring, which is shown by an oscillation of the chassis.

If it is a question of a rut, the phenomenon that occurs is the reverse, and the "Aeros," through its internal pressure, brakes the abrupt descending motion that the chassis might undergo through the effect of its inertia, and a breakage of the springs is thus prevented.

It will be seen that the rôle of the "Aeros" is slightly different from that of all known apparatus, and, on this account, it is of interest to direct the attention of motorists to it.

While the experiments for the testing of the efficacy of this pneumatic suspension has proven satisfactory, so far as can be learned, the durability of this contrivance may be subject to many doubts, no road trials covering a long period of usage having been undertaken.



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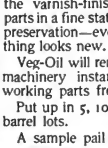


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GOOD ROADS CONSTITUTIONAL AMENDMENT

Of the seven proposed constitutional amendments to be voted upon at the New York State election on November 7th next, three relate to the issue and payment of State bonds, and one of the three is of especial interest to motorists in that the subject of it is road improvement. The Constitution as it stands requires that no bonds shall be issued (except for several specific purposes named) without authorization by popular vote, and that the law shall in every case levy a tax sufficient to pay interest and provide for payment of principal in eighteen years. One of the amendments now proposed extends this term hereafter to fifty years. The vote, two years ago, for one hundred and one millions for canal enlargement is the moving cause of this proposal to extend the term, and since there is no good reason why posterity should be deprived of the privilege of bearing its share of the cost of works by which posterity is expected to profit, this amendment, which stands on its merits independently, may be expected to succeed.

Now comes a plan to expend five millions a year on the part of the State, for ten years, in aid of good roads construction by counties and towns, provided they contribute an equal amount themselves, and the proposed amendment of interest to motorists as such is to permit the issue of State bonds accordingly.

New York State has never had a large debt; on the contrary, it has been notable for the smallness of its debt. The largest amount in the last sixty years was in 1865, when it was under fifty millions, and in 1893 the total was only six hundred and sixty dollars, which still stands as a past-due obligation. The one hundred and one millions will doubtless take its place in course of time, but at present the outstanding bonded debt is only about eleven millions, all except less than three-quarters of a million being canal. Massachusetts has a funded debt of about one hundred millions, and the interesting feature in this connection is that nearly five millions is for highways, and over eleven millions is for metropolitan parks, although the most of the latter is rated as contingent, cities and towns being under pledge to raise a sinking fund for it by taxation. The wonderful and unique system of natural parks and improved roads therein for pleasure driving in the suburbs of Boston, fall in this class.

The proposition now made is straight common sense in offering to help self-help. If a donation straight from the public treasury were proposed and ratified at the polls—as it certainly would ill deserve to be—not a hamlet in the State but would hold out its hat. When the State aid is to be covered by an equal amount from the locality there is a guaranty that business is really meant and also some reasonable assurance that the work will be done well; self-interest will be present to see that value is received for the money. The encouragement of good roads may—and certainly ought to be—after the example of Massachusetts, where, for a number of years past, the State has had a custom of going into a town and building there, gratis, a short bit of genuine road; then every person who drives gets a practical hint and reminder whenever he goes on or off the good bit, and thus the object-lesson works until that locality gets to the point of having more of such a good thing.

The thing now is to do as we believe. Good roads are good and efficient tools, comfortable and profitable; bad ones are the reverse. That is all, except that the one pays and the other burdens, and that a good road is, further, like a good tool, in that it must be made—it does not grow—and it must be kept good. It is for the motor car to take up and continue with the bicycle in what the latter has so greatly helped. Not merely for pleasure, certainly, because pleasure uses are but one capacity in which the motorist is interested in the subject.

The Good Roads amendment is therefore presented for remembrance and action on election day.



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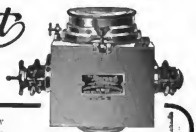
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Can Your Car Do This?

This is a good question to ask the demonstrator before buying.

In most of our illustrations we have used a view showing a front wheel raised, tilting the lower frame, but leaving the **body frame** level.

This shows a rear wheel raised over a foot, tilting the body frame but leaving the **lower frame** level.

All roads afford many parallels for this condition.

Observe that raising one wheel does not affect the other three wheels in the slightest. Observe that no matter what wheels are raised, no matter which frame is tilted, the power plant and **rear axle are maintained in perfect alignment**, doing full duty without strain or undue friction in any part.

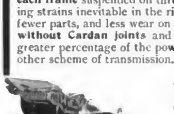
Another point, it is not left to the springs to bear the shocks entirely. The flexibility of the gear relieves the springs to a remarkable degree. Nor do the springs bear the driving strain, as this is direct from rear to front axle through radius rods.

Any Marmon owner knows, when he is speeding along over rough roads with an easy, gentle sway unknown in any other car, that the entire mechanism is equally at ease, conserved for a long and useful life.

The reason for this important elasticity lies in no mere combination of springs, but in the **exclusive** patented feature.

Double Three Point Suspension

Luxurious cast aluminum body on one frame, power plant on another frame, **each frame** suspended on three **pivotal** points. Eliminates the binding and twisting strains inevitable in the rigid suspension of all other cars; means simpler parts, fewer parts, and less wear on all parts, **tires** included. A straight, rigid shaft drive **without Cardan joints** and an inner driving axle that bears no weight, deliver a greater percentage of the power of the motor to the wheels than is possible in any other scheme of transmission.



The Marmon four-cylinder motor never overheats or "sticks," due to perfect air-cooling and an oiling system that is unlike any other and superior to any other the world over.

We have hinted here at the **reasons** set forth in our booklet. Write for it, specifying Booklet No. 4.

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Do's and Don'ts

MOTORIST'S EXPERIENCE BOOK

Adjusting Ball Bearings—When adjusting a ball bearing, remember that the lock nut, when tightened, forces the mant nut closer to the bearing, owing to the necessary amount of looseness in the threads. If the threads are fairly well fitted the correct adjustment will be reached by screwing up the main nut till the balls bind, and then backing it two notches of the locking washer or other rotation-preventing device. If it is backed only one notch the balls will bind again when the lock nut is tightened. The bearing should, however, always be tested after the lock nut is set up, and should never be in the slightest degree tight in any position.

"Horses" for the Tireless Car—Now is a good time to make the four "horses" on which the axles of your car must rest during the winter, when the tires have been taken off and laid away or sent to be repaired. They should be high enough so that the tires, when on and inflated, will clear the floor, as this enables them to be used on occasion as substitute jacks. Each "horse" is made of five pieces—a thick backbone about 18x4½x3½ inches, or thereabouts, and two pairs of board legs arranged like inverted V's. The sides of the backbone at each end are cut sloping so as to give the legs the proper slant, and plenty of nails are used, as the nails virtually support the weight of the car.

"Straightening" a Chain—Two boys with a few hundred carefully hoarded dollars spent them on a "light touring car." It was a good car—good as an example of its kind. The body was stylish, with a nice side entrance. The paint was splendid. The motor had two opposed cylinders, and developed plenty of power. It was a pretty good motor, and the planetary transmission was fair. But the rest of the car might about as well have been stamped out of tin plate. Well, the chain jumped the large sprocket one day and broke the sprocket in doing it. Before the sprocket let go it had put a lot of kinks in the chain, and the repair man, when ordering the new sprocket, proposed to order a new chain also. Some wiseacre, overhearing this, pronounced the chain purchase a waste of money, and offered to "straighten" the damaged one. The repair man replied that the job was impossible short of cutting out the pins and flattening each link separately in a press. But the boys had heard, and—well, a five-dollar bill looked a good deal bigger to them just then than before they owned that car. So the wiseacre went to work with hammer, cape chisel, and anything handy, and in due time he exhibited the "straightened" chain. Within an hour or two after the chain was put in service on the new sprocket it jumped again, broke the sprocket, and likewise smashed the differential housing all to pieces. And when the agent in town was applied to for a new housing he exhibited a stack of orders an inch thick for that same important part, all of which were awaiting shipment. Maybe the boys whose shot at economy missed fire so badly will be able to save pennies enough, during the month that their car will be laid up, to pay for the repair, but I doubt it.

A Bent Brake Lever—If you are tired of life and don't just like to commit suicide, try straightening something like a bent steering knuckle cold. It may break in the straightening, to be sure, but if it does not the nature of things will do the rest of the trick for you very neatly. A friend of mine nearly met his finish through breaking, not even of a steering knuckle, but of the emergency brake lever. It was of the usual push type, and when it broke my friend partly fell against the steering wheel, turning it to the left and swerving the car sharply into a fence, upsetting it. Happily he escaped with bad bruises and a general shaking up. I saw the offending lever a little later. It was rather light, of elliptical section, and had been drilled in two places along the back for short cotter pins to be driven in, the eyes of

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THOMAS

1906

A Personal Statement from Mr. E. R. Thomas

"Hitch Your Wagon to a Star"

My friends have long known that it has been my cherished ambition to build the best car in the world, or, at the very least, one of the greatest.

I do not mean the fleeting reputation gained by enormous outlays for advertising and the performance of road and racing stunts by highly paid employees, with special cars, or well groomed individuals of social and business prominence always accompanied by factory experts. But I do mean the permanent reputation founded by actual performance in the hands of the general public, which comes solely from intrinsic merit.

Years ago—surrounded by noted mechanical talent—we built one of the great bicycles of the world, which was better than any foreign continental production. The principles of automobile construction are the same, except mechanical power is substituted for human. Since 1897 I have been building vertical gas engines by the thousands. Then why not, at least, one of the best automobiles?

I know that with us it was only a question of design, material and time. It was not a question of experience in fine workmanship. We had that. Nor was it a question of profit, for that would surely follow.

In 1904 daylight began to appear. Two-cylinder vertical motors were the vogue. I went one better, and built three at the same price. It was far superior to any two-cylinder proposition on this side of the world or the other.

Design was greatly improved, crude and accessory manufacturers improved their material, the car proved highly efficient and the star we had "hitched to" seemed nearer and brighter. It was in this year that I designed the safety device which has saved lives—also the curved dash with small tool lockers and the chain pull that equalizes the strain on the main bearings. We also used chain oilers on the crank and transmission shafts.

In 1905 we built a four-cylinder car which, with nominal advertising, no traveling agents, and no performance of road or racing stunts, requiring special cars and highly paid factory experts, we again caught the public favor and quickly sold four hundred big touring cars—no more and no less. We were compelled to refuse many additional orders, some with bonuses above the price of from $250 to $750.

It was in this year I patented the now famous dust-proof body and introduced lockers and rails for wraps and many other features of comfort and efficiency.

The result in every way exceeded my most sanguine expectations, and the star shone still brighter and was much nearer.

Our success was so great I have about completed a new model fire-proof factory constructed entirely of concrete, steel reinforced. The mechanical equipment has been greatly increased. The capacity is one thousand fifty horse power automobiles.

I have the same superb mechanical force who are inspired by the same ambition and who are co-operating with me loyally and energetically to realize our high ideals, and which we believe will be fully realized in the 1906 Thomas Flyer, which has been greatly improved in every detail of workmanship, material and design, notably:

Forged I beam axles—great strong steering knuckles—steering apparatus all forged. No brazed joints. Cross steering rod behind front axle. Large separate motors. Mechanically operated valves opposite sides. Improved radiator fan and pumps. A disc clutch that will not slip under any condition when engaged. Four forward speeds—with one Hyatt roller and five Hess Bright bearings. Altogether, fifteen Hess Bright ball bearings, one Hyatt roller and two ordinary ball bearings twenty-one anti-friction bearings in all. A beautiful new dash and body seating five or eight as desired. Four great, big, wide brakes—the foot alone will stop a loaded car on a 25 per cent. down grade.

I am very proud of the New 1906 Thomas Flyer, and I believe the American public will be proud of it. The best foreign cars may have some few unimportant details that we haven't got, and we have some important ones they do not possess.

But we have put the design, material, workmanship and money into this car to make it at least equal to the highest-priced car in the world, and I believe that the verdict of a just people will, based upon intrinsic merit solely, place the 1906 Thomas among the world's greatest and best, and as such I present it.

E. R. THOMAS, for the E. R. Thomas Motor Company

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which guide the latch rod. It was at one of these weakened points that it broke, showing a very crystalline fracture. When the owner "appeared on deck" again I put him through a little catechism: "Did that lever ever bend before at that point?" "Yes." "And you straightened it?" "Yes." "Cold, I suppose?" "Yes, but it didn't show a sign of a crack. Not a sign." "Well, you deserved your luck. Of course, you knew it was cheap stock." "Oh, it's all cheap stuff!" "Humph!"

An Emergency Repair that Failed.—A man I wot of bucked a hitching post the other day. He had a light car, with light steering knuckles. The knuckle arms projected forward and were of the delicate, ladylike sort, over which (at the ends) you could slip a wedding ring. One of these pretty little things was crumpled into a very good imitation of a pretzel, and when the car had been towed to its garage the owner wanted it straightened. "I haven't any forge," replied the young but practical proprietor, "but if you will wait a little while we will take out the mate to this for a pattern and send them to a blacksmith shop for you." "Oh, pshaw! I can't wait for that. Just put it right in the vise and bend it. You can have it all done in ten minutes." "But that will break it. It won't stand bending back cold." "Oh, yes, it will. It's good metal, I'll risk it." "Well, if you're satisfied, I am. But I'm telling you it will break." The arm was taken out, gripped in the vise under the eye of the owner, and the wrench applied. Snap! "Now, then," said the young man, with a nod toward the crippled car, "I guess you'll leave it here awhile!" He did, of course; and if he isn't congratulating himself that the arm broke in the vise instead of later on the road, he ought to be.

Function of the Thermostat.—A common mistake of the beginner with a White steam car is to suppose that the good or ill functioning of the thermostat is directly indicated by the steam gauge. As a matter of fact the steam gauge, taken in connection with various other things, does indicate to the expert approximately what the thermostat is doing; but if one wishes to know precisely whether the thermostat shuts off the fire at the proper temperature of 460 degrees Fahr. or not, the only way to tell is by a regular thermometer test, which few persons are qualified to make correctly. The thermostat, as its name implies, is governed solely by the temperature of the steam surrounding it. If the steam were saturated there would be a definite relation between its temperature and pressure, but the pressure is determined primarily by the diaphragm regulator, which closes the by-pass valve, thereby causing water to enter the generator, at about 325 pounds pressure. The steam, meanwhile, is being constantly drawn upon by the engine, and, superheated as it goes, the superheat being applied after it has severed all connection with the water. The thermostat simply shuts off the fire when the steam is superheated too much, and opens the fire again when cooler steam reaches it, the cooler steam meaning that the water—under the action of pump and by-pass—is nearer the thermostat, so that more fire is needed to convert it into steam. If there were no thermostat at all, and the fire burned continuously, the pressure would be no greater, since the regulator would cease to supply water when 350 pounds was exceeded. What would happen would be that the steam would be so greatly expanded that a very little water would suffice to maintain the pressure, and the excessive heat of the steam would burn the oil in the engine, char the packing, and even permit the steam pipes exposed to the flames to corrode and burn. To the practiced operator the odor of fried oil from an overheated engine is unmistakable. The fire should come on and off with a clean, well-defined sound, and at medium speed it should not continue burning too long after the pump has stopped sending water to the generator. If the fire burns much of the time, when running slowly, the thermostat is out of order.

Faulty Governor Connection.—If the governor on your car does not act at a slow enough

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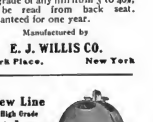
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speed—thereby causing the motor to run too fast "on the governor"—it may not be a change in spring tension that is needed so much as a change in the length of the link connecting the governor to the throttle. If, for example, the governor pulls on this link to close the throttle, and the link is too long, it is evident that the governor weights may expand to their full extent before sufficient movement is given the throttle to close it. This is a matter with which the governor springs have nothing to do. The remedy is to shorten (or lengthen, as the case may be) the connecting link, so that the throttle closes when the governor weights are expanded nearly to their full extent; then, if necessary, alter the springs to cause the weights to expand at the desired speed. Readjustment of the connecting link is especially likely to be needed in old cars, owing to wear in the joints, etc., as there is seldom any adequate means to oil these or take up wear.

Sticking Trembler Contacts.—Too strong a battery current may cause the trembler contacts on the coils to fuse and stick. If the coils are wound for four volts and two storage cells are employed there is no danger; but if one uses dry cells and changes from, say, a spent set of five or six to a fresh set of one of the new makes of cells, giving perhaps 25 or 30 amperes on short circuit, there is danger of overdoing the thing. Three of these cells are often enough.

Effect of Cleaning the Air Intake.—If you buy a second-hand car you are likely to find the burlap or wire gauze strainer at the mouth of the air intake clogged with dirt. When it has been cleaned—with a toothbrush and gasoline, if wire gauze—a readjustment of the carbureter will probably be necessary. The effect of cleaning the gauze is like enlarging the intake; it reduces the suction, and less gasoline is taken up. The readjustment, therefore, must be in the direction of more liberal gasoline feed. If part of the air stream goes around, but not past, the spray nozzle, the readjustment must reduce the amount of this diluting stream. If the carbureter is automatic the spring on the valve controlling the diluting air stream must be readjusted to increase its tension.

Coasting.—If you have stopped your motor while coasting a hill, it can be started before reaching the foot by letting in the clutch with the high gear engaged. In doing this, be sure the spark is retarded, otherwise you will get a violent kick-back, and, possibly, a broken crankshaft or bent connecting rod. A short descent is usually taken either with the clutch out or, if the car must be held back, with the clutch and spark in and the throttle closed. For long coasts there are several ways of treating the motor, and that must be selected which best fits into the control system of the car. If the motor be hot, the best plan, when it can be practised, is to switch off the spark and open the compression cocks, letting the motor turn over a few times before unclutching. This draws pure air into the cylinders to cool them, or at least dilutes the mixture so that there is not much danger of a muffler explosion on restarting. If the motor is water-cooled it may be as well to keep the clutch in, throttle as much as possible, and open the compression cocks if there are any. This will cool the cylinders inside while keeping the pump at work, thus preventing the water from boiling, and if the hill is not too steep the motor will hold the car in check. If the brakes are necessary one must generally unclutch. In the extreme cases where the brakes are insufficient, the intermediate or low gear may be engaged and the car held back by the throttled motor, which is then turning fast and absorbing a great deal of energy. In that case, of course, the compression cocks must be closed and the switch opened. Generally one must have the right gear engaged before beginning the coast, as it is a ticklish thing to change if, as usual, the brakes and clutch are connected.

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You ought to hear Barney's chaffeur sound the praises of the Goodyear Detachable to all who will listen to him—hear him tell how reliable it is—how it saves him time, trouble and worry and makes his position easy. He says he never thought it possible (before using the Goodyear) to embody all the good points a tire *ought* to have in one single tire.

We wish you could come with us to the factory or to one of our branch stores. Then you could see in no time for yourself just why and how these things are true. You can "see through" it all instantly when the tire is before you.

We'll try, however, to explain just *one point* here.



Why the Goodyear Detachable Auto Tire is *Durable* and *Resilient* at the same time.

Look at the section of the Goodyear Tire in the center column. Notice the crescent shaped portion in solid black where the wear of the road comes. That's dense, firm rubber, as tough as rawhide—practically no wear out to it.

Now right underneath this is the remainder of the outer casing (shown in grey) which is made from pure para rubber, as resilient and springy as it is possible for rubber to be.

These two different kinds of rubber—the dense, tough composition, to take the wear, and the soft, elastic rubber, to make you ride easy—are made into one solid piece by a special process. You can't skin the two kinds of rubber apart with a knife. Try it if you doubt.

The soft rubber portion is strengthened by having our *special fabric* vulcanized into it. This fabric is not the hard, inflexible sail cloth used in ordinary tires, but is woven like basket work, or an open-work stocking, and *gives* back and forth under pressure, and allows the elasticity of the rubber full play.

The dense rubber, the soft rubber and the special fabric together make a tire that's almost as durable as a *solid* tire, a tire difficult to puncture yet one which is as *resilient* as a man could reasonably ask.

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Actual size.

THE MAKE AND BREAK SPARK

(Continued from page 53)

intensity than when running rapidly, and this is as it should be, for a cold motor not only requires a larger spark, but frequently has a less perfect mixture.

In the device shown, the operating plunger permits the hammer to drop when the plunger is at or near the top of its movement, while a little shifting of this plunger to one side or the other causes the drop to occur earlier or later without perceptible difference in the height of the lift, thus insuring that the strength of the blow delivered by the hammer, the strength of the contact, and its length of time all remain practically constant.

By this arrangement no needless contacts or sparks are produced, whereas former arrangements were of necessity provided with sufficient length of contact to insure a spark at high speed, and since these speeds were frequently twelve hundred to fifteen hundred revolutions per minute, it is quite evident that the contacts were a dozen times longer than they need be at one hundred revolutions per minute, and two or three times longer than needed at average speeds. With the arrangement shown, this excessive drain on the battery is avoided. This arrangement, therefore, is as much better than the usual jump-spark arrangement, as it has heretofore surpassed in these respects the well-known make-and-break arrangement.

Our device then presents the following advantages:

It cannot be short-circuited. This makes it perfectly safe to use dry cells without switches and with the shortest possible wiring. It makes the largest possible spark, due to the fact that part of the current is not wasted in transformation, as in the jump system, and also that the accumulated energy of the cell is used to the fullest.

The mechanism has less pieces than most devices, all things considered, and, lastly, the pieces are not delicate and liable to get out of adjustment, which insures low cost and great satisfaction, but if needing repairs the entire device can be easily replaced with a perfect one.

Any source of direct current may be used with practically equal satisfaction, and a coil suitable to the current is easily secured. Because of the low quantity of current used in connection with the jump spark, large and heavy magnetos have usually been necessary, and heavy storage batteries or large dry cells have been in common use. A magneto manufacturer, in a recent bulletin, very truly says that his igniters "are designed for the make-and-break system, and are not recommended for the jump-spark system, because jump-spark coils require a relatively large volume of current as compared with the other." This system permits the use of small, light coils of slight cost and with certain forms of magneto or dynamos does not require any coil at all. It is particularly satisfactory with small shunt-wound dynamos, which, on instant contact, discharge their fields with a large spark, needing no coil.

Mechanical devices, however, mean more moving parts, requiring oiling and care, but the popular vehicle of the future will have as few parts as possible. Prophecy is a perilous thing, but on this account it seems very likely that the dry cell will be given preference, as it has in the past, because of its low first cost, its absence of bearings, gears, pulleys or sovereigns, and because, when exhausted, it may be readily replaced at any village. The increased economy of this device not only gives a larger spark, but since it draws on the cells less rapidly, their life will be several times the average life at present, and instead of one to three thousand miles on a single battery, five to ten thousand may be with reason expected. It would seem, therefore, absolutely certain that this is the ignition device of the future, and that when this is made up in proper form, with the same experience, intelligence and care as has already been devoted to other systems, it will not likely be replaced so long as electric ignition is used.

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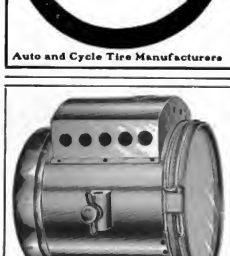
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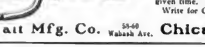
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MOTOR FOR THE ADVERTISER—PROFITABLE FOR THE READER—INTERESTING

THE TRUTH ABOUT THE LANCIA-CHRISTIE ACCIDENT

For the following account of the accident Morrow is indebted to Mr. J. Aspinwall Hodge, a New York motorist and an eye-witness of the affair: "I was standing at the roadside, directly opposite the wooden platform which spanned the gutter on the right hand side of the road and upon which Lancia's car was standing, and where he was having three tires replaced, when Christie rounded the 'S' curve half a mile away, and came down the grade at a high and constantly increasing rate of speed. Lancia's mechanic was cranking the engine, the crowd was shouting "Car coming," as was also the signal man, who, with a red flag, was standing in the middle of the road where Lancia could see him. I had not seen during the day one car pass another, and I was anxious to see how they did it, and looked from Lancia's machine to Christie's and back to Lancia's and watched developments. Lancia's mechanic was quick about his work, and the instant he had started his engine, sprang to his seat and Lancia started. Instead of keeping to the right of the road, which was clear and free, he turned almost immediately to the center of the road. He had not gone thirty-five paces (I afterwards paced the distance) when Christie was upon him, having turned to the left and having one wheel in the grass at the roadside. His entire car cleared Lancia's rear wheels, except the rear hub of his right-hand wheel, which hit the rear tire of Lancia's car. Instantly the rear of Christie's car bounded into the air. It seemed as if it went up ten or fifteen feet, and the two men were hurled still higher. This point was midway between two telegraph poles, and there was no fence or trees, but a soft soil covered with long grass. Otherwise the accident would have surely been fatal. Christie was on his feet in a minute, and within a few minutes the mechanic had recovered consciousness. Lancia proceeded on his way, and his car disappeared in the distance, seemingly unhurt. (I understand, however, that he was laid up a mile down the road for some time, variously reported at from five to forty-five minutes, to put on a new rear tire.

"At the time of the blow of Christie's hub against Lancia's tire, the car bounded into the air, turned a semi-circle, as if it had been on a turn-table, and finally rested on the grass at the right of the roadside, close to a telegraph pole, about thirty paces from the point of impact, and facing, of course, in the opposite direction from that in which it had been running.

"After the accident I very carefully examined it. It was covered with oil and dust, so that the slightest scratch would easily show. It showed no scratch anywhere, but one-half of the rear hub was as bright as if it had been recently wiped off and polished. The impact had forced the hub back, and so bent or broke the rear axle and the spring next to the wheel, twisting the rear wheel around to an angle of forty-five degrees. Except for the injuries to the rear axle, the rear wheel and the springs, his car seemed wholly unhurt.

"The crowd who saw Lancia start was almost unanimous in declaring that they saw him look around just before starting, and that he saw Christie coming. I was looking at the time first at Christie and then at Lancia, and I did not see Lancia look; but it appeared to me that under the circumstances, with the crowd yelling "Car coming," the flagman waving the flag, and the man starting out into a track that was being used, if he did not look he should have done so. He had plenty of time, for Christie was on the straight stretch west of the 'S' curve and in full sight before Lancia's mechanic began to crank the engine—in fact, before the jack that had been under the front axle had been wholly released."

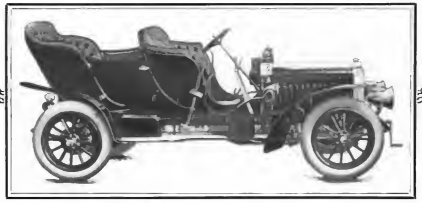
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$2,000



The C. H. Blomstrom Motor Co.

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MOTORISTS' LIABILITY INSURANCE

MOTORING is like marrying. You are, or ought to be, reasonably certain of doubling your joys, but also there are contingencies, and you are not certain, even after you have tried it a while, just what you are going to get. Each is a mixture; not all bad, or it would be intolerable; not all good, or it would be super-earthly. Each is exposed to liabilities. In motoring, as everybody knows, there is liability to accident, to hostility, to unreasonable arrest; and there is more—there is just plain "liability." A car may injure itself, or its occupants, or some person or thing outside; or it may be unjustly or fraudulently accused of so doing.

You can be full of precaution, and unquestionably that pays; but you cannot give caution, or sense, or skill to others. The pedestrian may behave before the car in a foolish manner, doing at the critical moment exactly what his conduct just before had indicated that he would not do. The chances of collision with persons on foot are somewhat greater and the consequences are vastly more serious than in the old days of the bicycle; and, what is more, the difficulties of successfully enforcing the sound doctrine of contributory negligence are much greater against the motor car than against the simple foot-driven wheel. Still more to the serious side of the case, the motor car is game in season always, but unprotected by game laws.

There are evidences enough of this already, and there is also a very interesting parallel which has been coming up. A popular magazine, in a curiously incidental and unintended manner, became interested in looking up the methods of persons who make a business of working fraudulent accident claims against transportation companies and large department stores. Subject to the drawback that the injury sustained is liable to take the form of doing time in a public institution, this business seems to be a pretty good one in return for capital invested, and there is what may be almost called an organization—certainly a system—for working fake claims.

Not to take space for many details, there are persons who feign paralysis with such grit as to resist the test of pins inserted in the flesh; they hold the feet in ice water, just before the doctor comes, in order to produce apparent deadness of those members; one fellow who had earned a living as an acrobat and knew how to fall suffered himself to be hit by a car and went off to bed, then discovered a better way, which was to do the getting-hit himself and plant substitutes in bed to represent him, till he sometimes had several beds in use at once. And so on—this may serve as a sample. The fraud has gone to such an extent and is so dangerously catching that a movement is now going on, with good prospects of success, for organizing the insurance companies, transportation companies, and other victims into an association by which to put an end to it, after the manner of the Bankers' Protective Association.

Now, a motor car may be the cause of a mishap without the occupants knowing anything about the fact, until demand is made for damages; for example, as shown by actual cases, a horse which it is on a side road or in a field, out of sight of the car and in such a position as not to be noticed from it, may take fright and do damage; or—which is more to the point—fright and damage may be alleged, and how is the owner of the car to successfully dispute the claim?

Popular feeling, especially the local feeling, is against him; he is assumed to be rich and in pursuit of idle amusement, and he is deemed fair game. He is liable to be deemed game worth hunting, and there is an interesting case reported which illustrates this. A car met a heavy farm team, pulled by the usual sleepy-looking horses and containing two men. The men took notice and signalled for a stop. The car stopped some little distance before reaching the horses. The driver tried to pass, but bungled, either accidentally or purposely, and tipped over into the ditch. The



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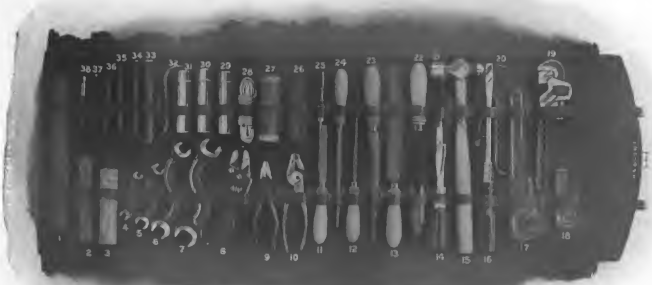
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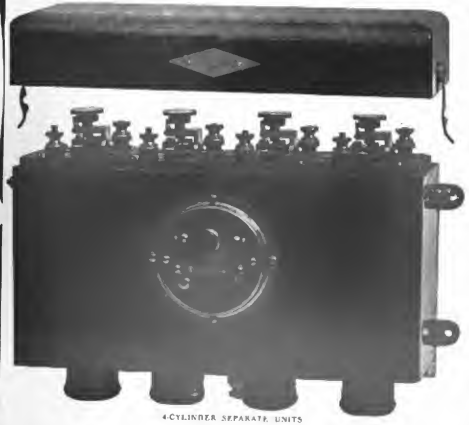
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REO for 1906

Built for What Happens

What REO Cars did in the past year demonstrated them built not for imaginary occasions but for actual motoring—and always ready for the unexpected.

It was *actual* weather and *real* mud that made many of the 50 starters in the Chicago-St. Paul tour quit half way and finish by rail. But the REO was one of the only four to come in on schedule time and on their own wheels.

Pecowic and Paddock Hills—up which REO stock cars held a 26-mile clip on a 12 per cent. grade, and captured 4 cups from cars of double their power-rating and price—are not theoretical difficulties, but *genuine* hills, that call for *genuine* power.

Old Mt. Washington is no stage scenery; but a *veritable* mountain. Up its 8 miles of ragged, dangerous, 10 to 15 per cent. grade (with patches of 25 per cent.), a REO car, in the great "Climb to the Clouds" cut down its class record 23 minutes, and beat its nearest competitor a minute to the mile.

Those were *practical* rocks and deep, *substantial* sand in the 1,050 miles of the famous Glidden Tour, over which two REO cars, without stoppage or repairs, carried 4 passengers each at a total cost of $1.10 per passenger.

The 1906 REOS do it all a shade better because of the same splendid construction; and a few slight improvements which put them right up to "concert pitch."

Write for the REO book that tells why

REO 1906 Touring Car 16 h.p., 1250 pounds, 90-inch wheel base, 5 passengers, side door entrance tonneau, speed 25 miles per hour. **$1250**

REO 1906 Runabout convertible into a 4-passenger car. 8 h.p., 900 pounds, 2 passengers, 25 miles per hour. **$650**

Or with folding seat to carry two extra passengers facing forward. **$675**

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SOLD EVERYWHERE

car owner and chauffeur got out and went to assist, finding a few straps broken, one man on his feet and the other taking on with groans and protestations that he was badly hurt, although there were no signs to indicate bodily injury. The wagon was righted, the man was taken home in the car and made comfortable, the car owner left his card, promised to send a doctor from the next town and to pay his bill and to himself stop in a few days and see how the man got on. When he called things looked bad indeed. With all seriousness, the wife said the doctor had called every day, with a prospect of a large bill; the sufferer had not been able to leave his bed even once, and the farm was suffering badly from neglect. The car owner would like to see him, perhaps. He thought so, and was taken to the room where the victim was lying and groaning. The owner looked; then grabbed the bed clothes and gave one yank, disclosing the unfortunate fully dressed in his usual working garb, heavy boots included. For a brief occasion only he was willing to lie (not to die) in bed with his boots on.

The moral is that the prudent way to meet this sort of thing, on whatever scale attempted, is by careful driving, by a firm refusal to be leeched and by the form of insurance known as liability. Of course no man can make a contract with another which will prevent him from being sued by any third party; but he can make one which will shift the cost and trouble to another. The insurance company substitutes itself as practical defendant, conducts the case and assumes guaranty liability for damages recovered. It buys its law by the year, or, at least, it employs counsel who are better up in the ways of fakirs and better skilled in this particular line than private counsel are likely to be; if it does not, the policy holder need not trouble himself—he holds his contract of indemnity. Some car owners, doubtless, already hold liability policies in their business of employing labor, and some may have had occasion to test it practically. Motoring liability insurance is a recognized branch already, and any car owner who wants to protect himself against what must be counted rather an indefinite hazard will find companies ready to deal.

THE MOTOR CAR IN THE FIRE SERVICE

THE city of Vienna has recently provided its fire department with a motor chemical engine, a motor steam fire engine and a motor tender, all of which constitute a train carrying a crew of fifteen men. The equipment of each car is such that all the operations of fighting a fire and saving life can be successfully performed therewith.

The most important unit for the first attack is the pump for extinguishing a fire by means of carbonic acid gas. The motor car that carries this is provided also with an extension ladder that can be raised to a height of fifty-five feet and be revolved 360 degrees. This combination offers the best means of attacking a fire in a few seconds, and, at the same time, of rescuing the tenants of the upper floors of a building. The ladder can be raised to the roof of a three-story house by one man in less than a minute. The water carried in the boiler of this apparatus, in connection with the cylinders of carbonic acid gas, permits of an immediate attack on the fire and of carrying it on with the utmost vigor after starting the electromobile steam pump.

The third vehicle, the tender, carries, in addition to a ladder with hooks and a portable sliding ladder, hose and coal for the steamer. It is so arranged as to permit of setting three nozzles in operation.

Facilities for storage, proper care, and repair of motor cars in Canada are yet meager and on the whole scarcely satisfactory. There are fully-equipped garages, however, in Montreal, Toronto, and Ottawa, with fair-to-good repair shops in these and a few other places. Canada has relatively more marine engine works than motor car establishments; these usually contain some skilled machinists who can be relied upon to use good judgment and good materials in lieu of technical knowledge of the motor car.

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4 cylinder, 40 H. P. cylinders, 5 in. bore, 5 in. stroke, 3 speed and reverse sliding gear transmission, 108 in. wheel base, shaft drive, lots of room, easy riding and ample power, everything of the highest grade.

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2 cylinder, under body, chain drive, 20 H. P. cylinders, 5¼ in. bore, 5 in. stroke, 90 in. wheel base, Hill's precision oiler, the fastest car for the price in the world. This car holds the 5 mile world's record for 2 cylinder cars, 6.18⅘ on a circular track.

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Price $1,500. 20 H. P., 100 in. wheel base, 32 in. wheels, 3½ in. tires, shaft drive, Hill's precision oiler, engine under hood.

Mr. Agent.—Now is the time to get *next*. Don't wait; our output will be sold within sixty days.

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because only the best of materials are used in their construction

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¶ All this and more, to o, will appear in the Illustrated Anniversary Number of the Los Angeles Examiner, to be issued on December 17th.

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Los Angeles Examiner Los Angeles, Cal.

MOTOR BUSINESS WAGONS

(Continued from page 67.)

to the way they are attached to the frame and axle, they prevent any vibration or bounce in going over rough roads. The transmission gears are very heavy, having one inch face and cut to six pitch. The clutch is of the contracting band type. On the fly-wheel of the motor is cast a flange with a two-inch face, with a steel band lined with "Gandy" leather. The ends of the bands are attached to two fingers that are pivoted at the middle, and by forcing a cone between the bottom ends to which rollers are attached the clutch band is tightened around the flange. The drive is direct by extra heavy chain, the front sprockets having nine teeth to thirty-two rear. Such a truck costs $2,000.

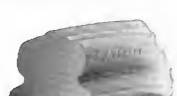
The Premier light delivery wagon is of the type that the makers have been making for over a year. The wagon is equipped with a 16 motorpower vertical air-cooled motor, which makes it especially adaptable to business uses at all seasons of the year, whether it be in the temperate zone, the tropics or in the northern cold. The carrying compartment of the body is 42 inches by 72 inches and 10 inches deep, the sides being also mounted with five-inch flare sideboards. This light business wagon has a Brewster green body, with canary running gear, extra heavy axles fitted with 32-inch artillery wheels, and 3½-inch tires are used, combined with a 118-inch wheel base. The driving chains are extra heavy, the entire vehicle being built with the idea of carrying a load of about 1,500 pounds at a speed from two to fifteen miles an hour. The price of one of these wagons is $1,400.

The Lansden electric vehicle does not differ externally from the regulation electric vehicle, excepting that it has mounted in front of the top a trolley pole, such as are so familiar on the conventional trolley car everywhere. Underneath the wagon is a loosely movable supported crosspiece supporting two groups of loose chain which make the return contact and complete the circuit to the rail. To understand the method it is necessary to state that the wagon starts from its garage by a storage battery, but as soon as the trolley line is reached it runs upon the track and a connection is at once made between the overhead wires and the pole. The chassis carries the regulation battery equipment of 60 Edison or 40 Exide cells and an 85 motorpower chain electric motor. In addition to the regular motor there is posteriorly located a 500-volt motor, which takes its current from the trolley wire with its ground return to the rails, as already stated. In operation both motors are operated by the same controller and drive by means of chains to a countershaft and from there by the double chain drive to the rear wheels. The extra motor has a solenoid operated circuit breaker connected with the shunt, which automatically cuts out the storage battery when the contact is made with the trolley wires. It is also so arranged that the battery comes into action at any time when needed. Both motors, however, may be used at the same time for climbing heavy grades.

It would seem as if this new type of electric vehicle would solve the distance radius problem for electric wagons in cities or suburban regions where trolley cars run, because then one charge of the battery would suffice for several hundred miles, bearing in mind, of course, the number of times necessary to leave the tracks. Equipped with a 60-cell Edison battery, the wagon will weigh about 3,300 pounds. A trolley ear uses a weldless tubular steel pole fitted with a heavy cast-iron base and large helical springs to hold it in position at its base on the turntable. These prove too heavy for a light top wagon, so the wagon is equipped with a bamboo pole having an aluminum contact wheel.



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SWINEHART TIRES

CHICAGO, September 30, 1905.

SWINEHART TIRE CO.,
Akron, Ohio.

DEAR SIR:

My four months' experience with pneumatic tires, in which I drove about four thousand miles, cost me over two hundred dollars, and such an incalculable amount of trouble and delays in my work, that I decided to try your tires. I have now driven them sixteen thousand miles, have never been delayed or had any trouble with them, and so far as I know the statement that they shake the car to pieces is entirely unfounded as I ride with ease of mind and body in my old Knox.

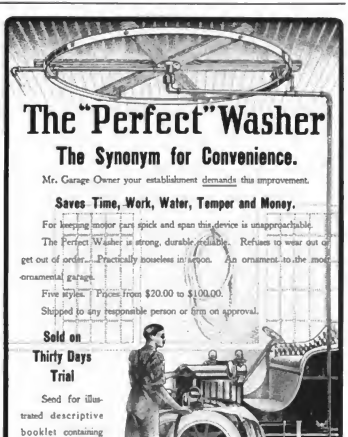
The tires aren't worn more than a half inch around the circumference, so don't see why a Swinehart tire shouldn't at least run fifty thousand miles. I will never run anything else, no matter what kind of a car I may have, as they surpass all my expectations.

Very truly yours,
DR. A. G. SCHROEDER.

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Saves Time, Work, Water, Temper and Money.

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The Perfect Washer is strong, durable, reliable. Refuses to wear out or get out of order. Practically houseless in action. An ornament to the most ornamental garage.

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No cranking under any circumstances.

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Announcement

OUR '06 line will embrace a Runabout Model "G" that defies comparison. A 2-cycle, 2-cylinder, 10 H. P. up-to-date car listing at $650.00. Same car in delivery wagon, with top, listing at $750.00. Both have bevel gear drive.

MODEL "E"

4-cylinder, 4-cycle, 35-40 H. P. Fully equipped and up-to-date. Roomy, double side entrance Sliding gear transmission.

Address

Wolverine Automobile & Commercial Vehicle Co.

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The sight feed herewith illustrated is for the dash of an automobile when our valveless oil pump is placed on the chassis. It enables you to keep your automobile clean, as no oil can possibly leak from this. It will not cloud and allows the entire pressure of the pump to be exerted through it to the imit of what the glass will stand, about 400 lbs., so that it is impossible for the tubes to clog. It indicates when the pump is working.

Write for circulars descriptive of the sight feed and also of the "valveless wonder" oil pump.

Mason-Kipp Mfg. Company

MADISON, WIS.

HOW TO REMOVE AND REPLACE TIRES

(Continued from page 50)

slightly moistened with saliva before inserting it, and set down to a firm seat before leaving it. A complete set of irons or tools for detaching and replacing the tire should also be carried, such as the maker of the tire usually furnishes or recommends, or some other type of tire tools that are sold in the open market as an accessory.

Some patching rubber should also be carried, and this rubber, it is essential, should be of the same weight and thickness as the tube itself. Thinner rubber is liable to cause a blow-out. If sheet rubber is used it is well to mitre off the corners of a patch, which will prevent the corners from curling up. Some small pre-cured patches, say three of each size, small, medium and large, are better still, because then you do not have the trouble of preparing it.

A small sponge should also be carried to clean the tube or shoe with gasoline. A purple indelible lead pencil is useful for marking with a cross the exact position of the puncture in the tube and is also useful to indicate where the center of the patch should be placed after the solution is spread. A small box of powdered soapstone or French chalk, some canvas patches to repair gashes on the inside of the shoe and a leather lacing band is also useful to help a torn shoe when placed on the rim, and to prevent the tube from coming through.

There are a number of small portable vulcanizers on the market, and these are sometimes very useful when touring in isolated districts, and for the man who tours with a car fitted with foreign tires it can only be said that he should go equipped with such valve parts and other replacements as belong to these tires, because American valves and valve parts will not fit the foreign construction.

A DECADE has elapsed since wireless telegraph made its appearance on the horizon, and in these passing years it has come to be a factor of the first magnitude in the scheme of social and commercial economics. As an example of occult manifestations by the most subtle of nature's forces it stands at the head of this class of phenomena, and the skilled labor it has called forth, that longer distances might be bridged, greater accuracy assured, and, above all, the correlation of the invisible and elusive waves which would render selectivity a concrete fact, may in a small measure be determined by a perusal of the pages of "Wireless Telegraphy," by A. Frederick Collins. It frequently happens that didactic treatises fall into the hands of the untaught, and the simplest of texts are sometimes found useful by the most highly trained specialist. A brief historical retrospect takes precedence at the beginning of nearly every chapter, and then, in order to fulfil in sequence the conditions cited above, the theoretical deductions, experimental physics and, finally, the practical workings are given, and by pursuing this course of treatment the book will find a hitherto unoccupied niche in the bibliography relating to wireless telegraphy. Published by McGraw Publishing Company, New York, 1905.

MOTOR CARS IN RUSSIA

Motor cars are coming largely into use for communication between country houses and the nearest town or railway, and also for inspection of estates. At present motor cars are supplied to Odessa by France, the United States and Germany. No British makes are on sale. For long runs the 12-motorpower machine is bought; for estate inspection, etc., the 8-motorpower car. Any one who wishes to try his luck in South Russia should remember that the roads are bad and repair shops may be far away, so that strength and simplicity are more than ever desirable. Water is often difficult to obtain, so that steam motors should have water space sufficient for long runs without need of replenishment.

A Cause of Knocking.—A possible cause of knocking in the engine is poor compression. If there is little or no compression the inertia of the piston and rod will lift them, at the top of the stroke, as far as the slack in the crank and wristpin bearings will permit; and when the explosion comes it will take up this slack rather violently. This naturally will most often occur at moderate motor speeds, when the charge has time to leak away and the spark is not so far advanced as to make combustion gradual instead of (relatively to the piston's movement) abrupt.

Rattle in the Propeller Shaft.—If your car has a propeller shaft drive, avoid extreme looseness in the cardan joints and other portions of the transmission. Anything that causes a rattle, as, for example, clutching and unclutching, and applying the transmission brake, is liable to hammer the pivot pins to pieces. And if one of these pins breaks its mate will immediately follow. If the bevel driving pinion is loose on its key, or if the cardan joint forging on the bevel pinion shaft is loose, the hammering will play both with that shaft's bearings, especially if, as is usual, they are ball bearings.

In the White steamer there is especial need of preventing looseness in the cardan joints, since with the throttle nearly closed the low-pressure cylinder is driven by the high, resulting in a very irregular turning movement, and a pronounced rattle, if anything, in the transmission is loose. There is always a little rattle, mainly in the bevel gears, but if the cardan pins are loose they are likely to be broken.

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embrace in their high class construction many distinctive features designed especially with a view to keeping to the minimum in
LOW MAINTENANCE COST
THE use of HIGH-GRADE BALL BEARINGS in shifting gears, transmission and differential gears permits an entirely adequate lubrication with a few hours of valuable time in repair shops. The BALL BEARINGS also add from 5 to 10 per cent to each motor ride and result in a small low expense. The safety and long life of HICKEL-STEEL FORGED AXLES must be evident, and the HARDENED AND GROUND CRANK SHAFT BEARINGS, PLATFORM SPRING SUSPENSION and TWO-UNIT SELF-STARTING SYSTEM, together with other similar features, play important parts in making the LOZIER MOTOR CAR a combined by and owner's car with a maximum of comfort, luxury, safety and minimum of expense.
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Gas Tank

Steady, even run of pure, cool gas, enough to supply two searchlights fifty hours. Never out of order, never leaks, never freezes, never clogs tips. Always ready with a full supply the instant it is turned on.

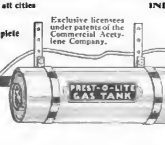
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CLEVELAND, O., July 27, 1905.
GENTLEMEN: I have used four of your Prest-o-Lite Gas Tanks since January 15th. They have proved entirely satisfactory and I don't believe I could get along without one now. You can always count on me being a steady customer. Yours very truly, BARNEY OLDFIELD

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Agents in all cities — INDIANAPOLIS

Price Complete $35 — Exclusive licensees under patents of the Commercial Acetylene Company.

Tank Recharged by any dealer at small expense.



DOUBLE THREE POINT SUSPENSION

(Continued from page 56)

the rear axle drive. The power plant and transmission being rigidly fixed to the lower frame are, of course, tilted as the lower frame is tilted. In effect, the power plant and rear axle drive are practically a unit, being maintained in perfect alignment under all road conditions.

The rear axle consists of a hollow stationary axle on which the wheels run, the driving axles floating within it and clutched to the outer end of the wheel hubs. Thus the only function of the inner axles is to drive the wheels, the shearing strain or weight being carried by the outer axle.

The Marmon double three-point suspension is used exclusively in the Marmon car. It is not the only new and strong feature found in this remarkable car, as the oiling system of its air-colled engine and improved planetary transmission are out of the ordinary and commendable. The solid cast aluminum body is also a fine piece of work.

MECHANICAL BRIEFS OF 1906 MODELS—WINTON

(Continued from page 58)

000 pounds to the square inch, giving sufficient resisting power for all emergencies.

The new muffler has a particularly effective expansion chamber and produces an exhaust that is almost negligible in its noiseless quality. For the open country this muffler is provided with a cut-out.

The dust-pan consists now of a permanently attached steel pan snugly covered with heavy canvas, which not only acts as a sound deadener, but prevents the motor from becoming covered by the dust or moisture.

The well-kuown form of Winton air-governor is still retained, and if the Winton car had no other feature this one thing alone would make it a great car, because it gives the motor an infinite variety of speeds at the command of the operator without shifting a gear or moving a lever, the whole mechanism being controlled for instance or variable speed by either the foot-button or the lever on the steering column. The mechanism consists of an air-pump driven by gear from the crank shaft. Compressed air passes then from the tube to the air receiver, which is used merely to equalize the air pressure, and then passes through to a chamber around the inlet valve stems. So long as this pressure in this is unrelieved the inlet valve cannot unseat, and therefore no mixture can be passed into the cylinders; but, as air is released more or less, the inlet valve unseats more or less, thereby permitting the mixture to enter the cylinder in proportion to the extent of the released air, and the motor accelerates or diminishes its speed accordingly. From the air-receiver an air-line runs to the foot button in which there is a conical valve. Now, the more pressure placed on this foot-button the more this valve opens, and consequently the greater is the release of the air in the air-line, and the more the inlet valve opens to admit its charge to the cylinder. In the operation of this air-control it is not necessary that the operator keep his foot on the foot-button continually, which might be tiresome, because the same result can be more easily secured by the use of the dial lever on the steering-wheel.

The steering-gear has been changed very much for the better. It is now of the screw-and-nut design with yoke and block joints, ball-and-socket joints having been abandoned.

Three brakes are fitted, two of them band-brakes on the driving-wheel hubs and a single hand-brake on the drive shaft, the brake surfaces having been increased twenty-five per cent. over previous models, thus insuring the greatest possible factor of mechanical and physical safety.

Returning to the cylinders, it is noticeable on examination of the parts that they are thoroughly ground. The cylinders, pistons, piston-rings, crank shafts, valves, universal couplings and transmission shafts are ground to gauge of one-tenth-thousandth part of an inch. Naturally enough this means a perfect fitting mechanism, absence of destructive friction, and great mechanical efficiency without waste of power. All the material used in the new models of which strength is required are thoroughly tested, especially the steel for frames, crank shafts, connecting rods, axles, etc., the testing mechanism consisting of an automatic and autographic 200,000-pound Riehle testing machine, which shows how many pounds' pressure or pull to the square inch the metal will stand before it cracks or breaks.

As the illustration shows, the body is of a new, graceful and practical design of the side-entrance type. An adjustable foot-rest is provided in the tonneau, which is really a comfortable accessory. The Winton twin springs have been retained, but are now of an extra length in the rear, an improved shackle making these springs more comfortable than heretofore. On the chassis and complete car shown in the exhibition car the rear springs were placed under the frame. It is, however, the intention of the makers in their first deliveries, which are now being placed, to increase the length of these springs and place them outside of the frame close to the wheel hub, where they will strengthen the axle-collars.

The new dash is made of hollow steel and carries the spark coil, oiler and auxiliary gasoline tank. The guards are now of extra width and made of laminated wood placed close to the frame to prevent dust from coming through, are extremely flaring over the front wheels, and have a horizontal extension over the rear wheels, a running footboard connecting both guards.

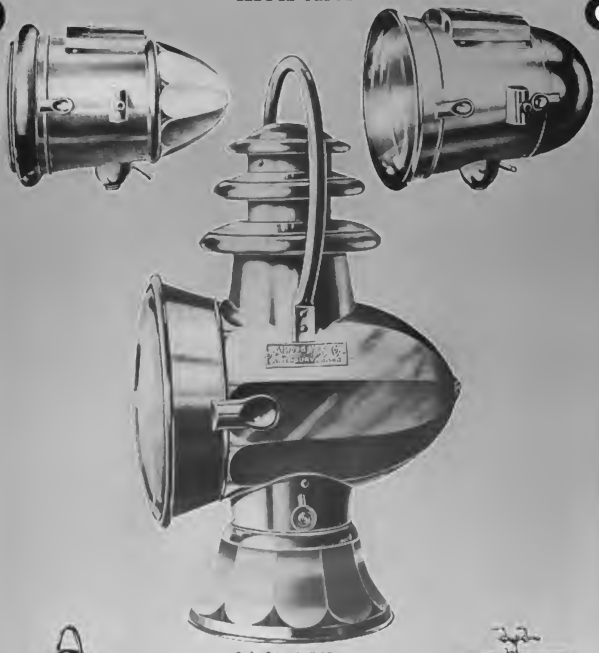
The main gasoline tank, which carries seventeen gallons, is placed at the rear of the frame under the tonneau, and has a locked cover.

The car, complete, costs $2,500 f.o.b. Cleveland; without the body, $2,250; with a Limousine body, $3,500, and a Limousine body only as an extra, $1,250.

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ALCOHOL FOR MOTOR CARS IN GERMANY

THE purpose of this article is to correct some erroneous impressions that have been created in this country regarding the materials used in Germany for the manufacture of alcohol for industrial purposes. Some facts regarding the use of alcohol for motor car and industrial uses are also pertinent and interesting. Judging from the amount of interest taken in the subject, and which seems to have been inspired by press statements published in the United States, it is apparently believed here that alcohol for industrial uses is manufactured in Germany from peat, street garbage, and various other materials, and that the use of alcohol as fuel for motors, especially for motor cars, has been recently begun and is rapidly increasing to vast proportions in Germany.

In reply to all these inquiries it may be said that alcohol is not made on an industrial scale in Germany from peat or from garbage of any kind. Aside from the small amount that is produced for drinking and medicinal purposes from prunes, grapes, cherries, and other fruits, the great sources of alcohol for industrial and other uses are potatoes, grain, and the molasses derived as a secondary product from the manufacture of beet sugar. From the official statistics of the last year's campaign in Germany (September 1, 1903, to August 31, 1904), the following figures are derived, which show the total production of alcohol from each of the three materials during the year, in hectoliters of 26.429 gallons each: Potatoes, 3,045,505; grain, 692,483; beet molasses, 116,211; total, 3,854,209 hectoliters (101,823,470 gallons).

In respect to the use of alcohol for motor purposes the following are the obvious facts: Several years ago, when the motor vehicle for military and industrial purposes began to assume a new and extraordinary importance, the German government became impressed with the necessity of building motors which could be operated with some liquid fuel that could be produced in Germany, in the event that through the chances of war or other cause the supply of imported benzine and other petroleum products should be cut off. Alcohol offered the solution of this problem, and all the influence of the government was exerted to encourage its production and its more extended use for motor purposes. Prizes were offered for the best alcohol-driven draft wagons for military and agricultural purposes, and all the great gas-motor builders gave great attention to perfecting engines specially adapted to the use of alcohol as fuel.

At the same time a powerful organization known as the Centrale für Spiritus-Verwerthung, with central offices at Berlin and branches throughout the empire, was established, and began a systematic, persistent campaign to encourage and extend the use of alcohol for various industrial and economical purposes, especially heating, and lighting. Special exhibitions were held from year to year, which have been fully described, and in which were displayed the whole apparatus and process of alcohol production from potatoes, corn, and molasses, motors of various types and sizes for marine, agricultural, and industrial purposes, and a vast assortment of alcohol stoves for heating, cooking, ironing, etc., and lamps and chandeliers in endless variety in which alcohol vapor, burned inside an incandescent mantle, produced a light of high intensity and cheaper for rural districts of Germany than either electricity or petroleum.

The net result of all this systematic effort has been to extend so rapidly the use of alcohol for heating, lighting, and chemical manufacturing purposes that when the drought of last summer reduced somewhat seriously the output of potato alcohol, the previous surplus was exhausted and the price advanced until alcohol became too costly for economical use as fuel for motors.

The consequence of all these conditions has been that while the general use of alcohol for industrial purposes, heating, lighting, and a vast range of chemical and other manufacturing purposes has steadily increased in Germany, the percentage of the whole product that is used for motor purposes is relatively small and, so far from increasing, is said to be rather diminishing, though to just what extent it would be difficult to prove. A few Germans, from patriotic motives, use alcohol for driving automobiles, freight wagons, motor boats, and farming machinery. A single department store in Berlin, which ordered its equipment of delivery wagons four years ago, during the height of the alcohol-promotion movement, still consumes nearly 80,000 liters (about 19,000 gallons) of alcohol for driving these wagons, but mixed, for greater efficiency, with about fifteen percent. of benzole.

It has been found by elaborate tests that the economy of alcohol as a fuel for gas motors is largely increased by its being carbureted through admixture with a certain percentage of benzol or other product of mineral oil. For a time it was believed that this admixture of benzole could not be safely carried beyond twenty percent., but more recent experience has shown that a mixture of equal parts of alcohol and benzole can be used, especially in large motors, with entire safety and economical results. For motor car purposes the usual proportion is now about thirty per cent. of benzole or gasolene, but at the present cost of alcohol it can not compete on the score of economy with mineral hydrocarbons in a country where they are either produced or imported free of duty.

There are now in use in Germany something more than 2,000 stationary or portable alcohol engines, exclusive of the spirit motors used in motor cars. They consumed in the campaign year 1903-4 36,000 hectoliters (951,120 gallons) of denaturated alcohol. Owing to the enormous potato crop of 1901 and the consequent overproduction of alcohol, the denaturated spirit of the grade used for motors could be bought in 1902-3 in any quantity for fifteen to seventeen cents per gallon, but for reasons hereinbefore stated this price rose in 1904 to thirty-five marks per hectoliter (about 31.5 cents per gallon), at which figure it became more expensive as motor fuel than gasoline.

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attempt to take off a clincher tire without proper tools?

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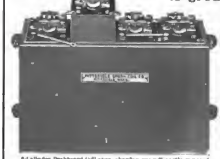
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is designed to furnish POWER pressure for inflating tires, instead of the old, laborious way, thereby lengthening the life of the tires, and saving time, money and trouble.
Light—Compact—Indestructible



THE P. T. C. POWER TIRE PUMP



is easily attached to the front of any car. Once attached, always in place. Started and stopped by simply turning a thumb-screw. Nothing to do but watch the gauge, and stop when proper pressure is obtained. Circular describing it in detail furnished on application. Write for it.

The Pacific Tucking & Mfg. Co., 471-473 18th ST. BROOKLYN, N. Y.

If you wish to buy or sell a second-hand car, see Motor Bureau page 123

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Tire removed in thirty seconds.
Replaced in same time.
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Sales easily made and every rim guaranteed.
Money refunded after 30 days if not satisfactory.
We want every dealer to become a BRYANT agent.
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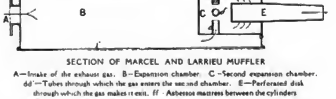
THE BRYANT STEEL WHEEL AND RIM CO.
452 Hayden Bank Bldg. - - - COLUMBUS, OHIO.

THE MARCEL AND LARRIEU MUFFLER

THE intensity of the noise of the exhaust is, as is well known, due especially to the violence of the vibrations that result from the abrupt shocks produced by the rapid expulsion of the burned gas. The height of the sound necessarily varies with the number of vibrations per second. The Marcel and Larrieu muffler, which is illustrated herewith, attenuates the noise, that is to say, the intensity and height of the sound, by utilizing solely the violence of the current, or, in other words, the great velocity of the gas. This apparatus, which has given excellent results, confirmed at the muffler competition of the Automobile Club of France, is based upon the principle that when two currents of gas of different directions meet each other they break and give rise to a current that expands without force.

Its construction, which is of remarkable simplicity, renders it very light. It consists of a cylinder formed of two thicknesses of iron plate. Between these plates, for the entire length, extends a mattress of asbestos designed to absorb the heat.

As is shown in the figure, the greater portion of the cylinder, which is completely free, forms a large expansion chamber. Near the outlet orifice there is a second expansion chamber which the gases enter through tubes placed exactly opposite and in pairs. In this second cham-



SECTION OF MARCEL AND LARRIEU MUFFLER

A—Intake of the exhaust gas. B—Expansion chamber. C—Second expansion chamber. dd'—Tubes through which the gas enters the second chamber. E—Perforated disk through which the gas makes it exit. ff—Asbestos mattress between the cylinders

ber there is an outlet tube containing a perforated disk designed to slacken the velocity of the gases at their exit, at the moment of their contact with the external air, which they enter without velocity and consequently without force.

At their entrance into the first chamber, through the orifice, *A*, the gases expand, and then pass through the ajutages *dd*, which, by their arrangement, precipitate them against each other in two opposite currents in the second chamber, wherein they again expand. From this chamber they are discharged through the outlet tube *E* without force, that is to say, without counter-pressure and, consequently, without loss of power in the motor.

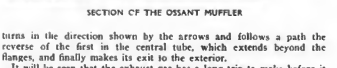
As may be seen, the apparatus is very simple in its operation, and its construction is such that no fouling is possible. It is mounted and dismounted through the screwing up or unscrewing of three bolts, a very simple operation that can be performed by any one.

THE OSSANT MUFFLER

THE Ossant muffler, which received a prize at the recent muffler competition of the Automobile Club of France, consists of a long galvanized iron cylinder containing several concentric chambers formed of cylinders that are likewise of iron plate. In the center, an inlet tube (which also serves as an outlet one) permits of the entrance of the gas into the muffler.

A vertical partition, placed in the center, divides the interior into two compartments. The arrows show the direction taken by the gas. This enters at the left through the central tube, which is connected through a flange with the tube starting from the escapement, and afterward passes into the first concentric chamber through an infinite number of small holes, since the central partition prevents it from making its escape. From there it passes into the second concentric chamber through a series of holes near the partition, and in the direction shown by the arrows, and then into the third chamber, of which the external wall limits the diameter of the apparatus.

As the central partition of this external chamber is provided with apertures, the gas passes into the second compartment, and hence re-



SECTION OF THE OSSANT MUFFLER

turns in the direction shown by the arrows and follows a path the reverse of the first in the central tube, which extends beyond the flanges, and finally makes its exit to the exterior.

It will be seen that the exhaust gas has a long trip to make before it escapes into the air, and that all the chambers that it has to traverse slacken its velocity and, at the same time, considerably reduce its temperature.

It should be remarked also that in the interior of the muffler there is some asbestos paper riveted against certain of the walls for the purpose of not only deadening the noise, but also for protecting the metal from the rapid oxidation caused by the temperature of the burned gas.

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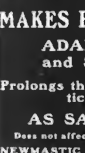
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CORRECT MOTORING APPAREL

(Continued from page 98)

one point, however, that the follower of the fashions who is blessed with a keen and observant eye will note instantly; and that is, that the best houses are presenting far fewer of what one might call freakish furs than heretofore. There are none of the zebra stripes and leopard-looking spots that were so conspicuous at many of the motor meets. Shaggy furs, too, are relegated to the background, and the very best models are such as Miladi Motorist could almost as well don for a drive behind a pair of horses, when making formal afternoon calls in town.

The men's garments may, and do, claim a proportion of those bushy-looking furs; but the woman of taste evidently will have none of them. For her there are really beautiful coats in mink, the stripes so matched that they form either a continuous dark line, or more often are biassed to a V design. A big pillow muff, and a quaint-looking hood with a goodly "curtain" to the back of it, are oftentimes offered *en suite;* and when the muff is not desired there are fur-lined and fur-backed gloves with big cavalier gauntlets of the fur that extend well up the arm, and prevent the cold winds of winter from making an excursion up one's sleeves, a prank that they are all too wont to play when the hands are kept outside the robe.

Beaver is a fur that is coming into a very marked fashionable favor; and some charming coats, of the long and loose persuasion, are shown in this almost universally becoming pelt. For the brown-eyed maiden it is especially attractive, no matter what the color of her hair and the coloring of her complexion may be; for it seems to deepen and intensify the coloring of the eyes to a most flattering degree.

In fur-lined garments, too, the loose and long designs prevail; and there are some beautiful examples displayed in which the outer covering is of tweed, broadcloth or a very heavy sicilienne that comes especially for this purpose. The fact that this latter fabric sheds the dust like water from the proverbial duck's back, doubtless keeps it in good demand by those who have experienced the ruinous qualities of the dust of the road. One sees some corduroy also, in this connection; but of other velvet fabrics nothing. The linings of these garments are usually of squirrel; either the deep gray Siberian squirrel that is still modish for all-fur garments, or else the hempster squirrel with its familiar white and gray markings. But no matter what the type and style of wrap it chosen—and it were better to have it of the full length and all-enveloping kind, for even in summer time the swift motion of the motor car creates a breeze that penetrates pretty nearly to one's marrow—it is the head gear that counts in the appearance.

For winter use, Fifth avenue furriers are displaying the most fascinating pompadour hoods that could possibly be imagined. Those who saw Mrs. Carter as Du Barry will instantly recognize the type; and as for those who did not, it were as well to say that the hood is loose and large, caught in at the chin with fanciful ribbons, and so shaped that it extends in cape fashion well down over the shoulders. Indeed, with a good, warm steamer coat on, and a pompadour hood for the head, one is fairly well and comfortably equipped for all motoring purposes; and both wind and weather may well be defied in such raiment.

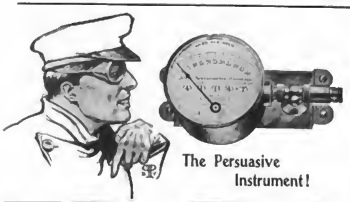
Those plush fabrics that present such a verisimilitude to many furs are taken advantage of by those interested in the production of motoring toggery. Some very fetching ones are on view at one famous outfitter's. An almost exact reproduction of caracul is in black, and the addition of a real ermine collar band serves to heighten the furry illusion. Persiana, too, is more than modish; and one toilette in this displays one of those smart raglan coats that are so full that one might class them as sleeved capes and then not be very far from the real truth of the case. Padded and quilted silk linings are displayed with those; and gay colorings, in marked contrast to the sober coloring of the furry outside, are employed.

The question of veils and veilings, each and every fair autoist expects to settle for herself. With the hood mentioned, just a chiffon veil is loosely drawn on over the hood; or where a hair-net is used, the veil is oftentimes dispensed with, especially for short trips to nearby points. For longer tours, however, the small turban hats are considered far more chic than are caps; and those are equipped with any one of several types of veils. Many fashionable mondaines cling to the usual face veil next to the hat; then a big chiffon veil that will envelop both hat and hair; and finally a third veil is draped with anchoring pins so that it may be worn back over the hat, and instantly drawn down over the face when so desired.

Just a glance at some of the garments prepared for exhibition at a coming motor-car show discloses that furs are really the most modish thing there is for winter wear. All of the fashionable pelts that go to make up Miladi's winter coats and wraps and scarfs are on view; but it is to be noted that it is the stouter qualities that are employed. For instance, chinchilla is conspicuously missing, and so likewise is baby lamb. Both are too delicate to withstand rough usage. Ermine is seen not at all, except just as a collar band, and then it is usually of the high military choker order.

But the furs that prevail are the dark, very dark gray squirrel, mink, beaver and sealskin, while sea lion and Russian pony—the unspotted skins in this latter—are variously fashioned into long coats. Another point that is indicative of the new fashions is that there is little or no mingling of furs, no trimming of one pelt with another, and it is only occasionally that a little touch of velvet or braid, or both, is employed as a trimming effect.

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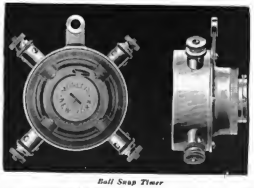
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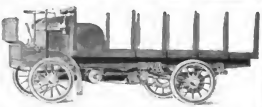
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FOR second-hand auto cars see A. G. Spaulding & Co., 31 West 42d St., New York City.

CAR FOR SALE.—We haven't, but if YOU have, others will see an ad. here just as you see this. 5c. a word.

AUTOMOBILES

October Clearing Sale

Special Sacrifice of 250 Slightly Used Automobiles

November arrangements compel us to make a quick unloading of 250 slightly used cars. As special bargains we name:

$1100	Prescott Steamers	$400
$750	Mobile Runabouts	$175
$1100	Mobile Dos-a-dos	$275
$3000	Mobile Wagonettes	$600
$900	Cadillac Tonneaus	$480
$2500	Winton Touring Car	$625
$900	New Toledo Steamer	$300
$2800	White Steam Tonneau	$675
$2500	Searchmont Tonneau	$475
$3500	Darracq Tonneau, 2 cyl.	$950
$3500	Doyal Tonneau, 4 cyl.	$1000
$2750	Haynes-Apperson Tonneau	$750
$2000	National Tonneau, 4 cyl.	$850
$2500	Packard Tonneau	$575
$2000	Pierce-Arrow Tonneau	$925
$3000	Sight-seeing Car	$950
$2500	Woods Electric Cabriolet	$600
$4000	Columbia Electric Brougham	$950
$2750	Woods Electric Hansom	$800
$2000	White Steam Stanhope	$380

Over 200 additional cars which we cannot name in the space allowed us. *Remember*, this is the largest auto depot in the world, the numbers 124-126-128-130 occupying one-fourth of an entire city block

Manhattan Storage Co.
Largest Auto Dealers in the World
334-340 West 44th St. NEW YORK CITY

AUTOMOBILE BARGAINS

GREAT bargains in NEW and SECOND-HAND Automobiles. WE are the LARGEST dealers of NEW and SECOND-HAND Automobiles in the United States, carrying in stock at all times from one to three hundred machines. Every known make to select from, ranging in price from $100 to $5,000. Complete bargain sheet of machines on hand sent upon request.

Times Square Automobile Company

164 West 46th Street
Two Doors East of Broadway

NEW YORK CITY

WHITE steam touring car, tonneau, 1905 Model, complete equipment, Goodrich tires, four extra inner tubes, newly painted. Only run 2,500 miles over city streets. Original cost $2,000. Will sell for $900. F. E. K., care of Motor.

BAKER electric runabout. A big bargain for $250. F. L., 1488 Broadway, New York City.

AUTO car, detachable tonneau, rear entrance, 12 H. P., 2 doors, all tools, "Never Out" searchlight, double generator, extra 1in shoe, extra inner tubes, two side baskets waterproof. $900 or less for immediate cash sale. John Magee, Chelsea, Mass.

PEERLESS 1904, four cylinder, 24 H. P., $1,500. Aluminum body. Tires new. Will give 100-mile demonstration. D. W. Worthington, 326 North Broad St., Philadelphia, Pa.

FOR SALE.—Auto car, perfect condition. Columbia side entrance. Almost new. Repairs a specialty. Work guaranteed. Mt. Morris Auto Garage, 27 West 124th St., New York City.

FOR SALE.—A 1905 Phelps four-cylinder touring car; side entrance; 25 to 30-H. P.; 108-inch wheelbase; handsome, roomy car; nearly new and in first-class condition; wheels 32 by 4 inches. Address Charles W. Briggs, 173 Broadway, Norwich, Conn.

FOR SALE.—Haynes-Apperson, Model M, 30-H. P., four cylinder, closed engine, five-passenger car. Purchased July, 1905. Has sparker on wheel and all the 1906 improvements. Guaranteed in A-1 condition. Will demonstrate any length of time and condition to prove it. J. F. Rose, Louisville Hotel, Louisville, Ky.

1904 MODEL Haynes-Apperson, light touring car, with top, horn and lamps, storm apron, etc. Bought late, used very little, looks like new. For quick sale will sell at $600. W. M. Stith, 29 N. Sycamore St., Petersburg, Va.

THOMAS, 30-H. P., 4-cylinder Pope-Toledo in the finest of condition; $1,000. Times Square Automobile Co., 164 West 46th St., New York City.

FOR SALE.—A 1904 White Steamer; sage top, lamps, horn; price $500. E. K., care of Motor.

FOR SALE.—One 1905 Royal Tourist; cost over $4,000 when new; will sell for $3,500; only used three months. F. B. D., care of Motor.

FOR SALE.—Richard Brasier car, with top; 24-H. P.; in fine condition; bargain. Hugh V. Roddy, Jr., 134 Montague St., Brooklyn.

GREAT bargains in electric autos; write for list. Ashland Electric Auto Garage, Chicago, Ill.

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FOR SALE.—14-H. P. touring car; cost $1,850; double air cooled engines, double drive chains; new June, '04; one order; $850 cash. Address Ohio, Box 3, care of Motor.

FOR SALE.—Winton 1904; good order; canopy and folding top, extra shoe, gas and oil lamps; cash or exchange. Oscar Bauer, 1919 Seventh Ave.

COMPLETE MODEL
GASOLENE TOURING CAR

Advertiser has completed and thoroughly tested out a four cylinder, vertical 30-35 horse power, four speed, touring car, which can be used by automobile manufacturers for 1906 market, as designs, shop drawings, wood patterns, etc., are complete, ready for use. Will sell all rights or retain part interest, with or without personal services. Address

COMPLETE MODEL
Care MOTOR

FOR IMMEDIATE SALE.—1903 Winton tonneau, $750; 1903 Model F Ford tonneau, 12 H. P., $605; 1905 Rambler Surrey I, 4-inch tires, like new, $825; Model E Rambler, bought Sep., $225; two 1904 Elmores, double cylinder, 14-H. P. tonneau, $200 and $300; drop card for detailed description; your opportunity to buy a good car below the market value. E. S. Yowe, Reading, Pa.

FOR SALE.—1905 model, Royal Tourist; run since August 5; owner buying 1906 model. L. R. Kirkpatrick, 233 Alexander St., Rochester, N. Y.

ORIENT buckboard, good as new, for $200. I. Hildebrand & Son, Codorus, Pa.

OLDSMOBILE tight touring car; single cylinder, 10-H. P., 1903 model; first-class condition; Dietz lamps and other extras; detachable tonneau; climbs any hill. Lock Box 8, Athens, Pa.

WINTON model B, 24-H. P.; Rand top and other extras; new in July; cost $3,000; in excellent condition; will sell for $2,300 cash. J. F. Harrison, 49 Stanwood St., Cleveland, Ohio.

BUICK 1905 touring car for sale; has not run 1,000 miles; Cope top, gas lamps, all complete, $1,100. Geo. M. Bowlby, 1 Broadway, New York City.

KNOX four-passenger, style C; first-class condition; tires O. K.; will worth $800; first check for $500 takes it; am getting larger car of same make. W. J. Marshall, 824 John R. St., Detroit, Mich.

FOR SALE.—1904 auto car, with tonneau, in fine condition; having just been thoroughly overhauled at company's shop; four new tires, acetylene lamps, etc. Apply W. C. Robertson, 338 St., Harlem, New York.

1904 WHITE steam touring car, perfect condition; equipped with Bullet lamps, baskets, odometer, etc.; three brand new tires; no reasonable offer refused. Spencer Borden, Jr., P. O. Box 1, Fall River, Mass.

FOR SALE.—Packard model L, four-cylinder, rear entrance; perfect condition; new last November; run but 1,500 miles; price $2,000; also Packard four-cylinder model N, side entrance; perfect condition; new in June; run 2,000 miles; price $2,100; no perfect in the condition of both machines that they can scarcely be told from new cars. Address Theodore Cox, Ottawa, Ill.

FOR SALE.—Larchmont 8-H. P., 2-cylinder, Hartford tires; never been punctured; artillery wheels; would trade for a Cadillac and pay difference. F. J. Dreher, 7 North Court St., Montgomery, Ala.

Selling Out—Big Chance

40-H. P. Thomas, French tires, lamps, etc., extras; $1,800.
Peerless, 24-H. P., side entrance, like new, $1,800.
Walters, 24-H. P., side entrance, $1,200.
Durrace, $350.
Haynes-Apperson surrey, $250.
Panhard, 4-cylinder, $700.
Decauville, 20-H. P., $1,900.
Cadillacs, $300 to $400.
Olds, latest type, $300 to $350.
Fifty others, $100 up. Tires, lamps, horns, at fraction of former cost; parts bodies, etc., at any old price.

Broadway Auto Exchange
137 to 143 West 48th Street, New York

FOR SALE.—Established auto factory in good manufacturing and distributing center in middle West; new models completed; satisfactory reasons for selling. Address P. O. Box 194, Indianapolis, Ind.

DON'T buy, don't sell, don't waste any more money. If you want to know a way to make $25 for 2c. and a little bit of hustling, write me. J. K., care of Motor, Send stamp.

FOR SALE.—Two Knox observation cars; 14 passengers; cars used three months on Paul Revere route; are in perfect running condition; will sell very low. Apply to Lexington and Concord Sight Seeing Company, Lexington, Mass.

OLDSMOBILE runabout, model 1903; top, extra seat, Cornet horn, very good condition; will sell for $200. Carle J. Bienner, 38 West 39th St., New York City.

OLDSMOBILE runabout; will sell for $300 or exchange. Write for particulars, C. J. Bienner, 38 West 39th St., New York City.

FOR SALE.—24-30-H. P., 4-cylinder Pope-Toledo, type VII, 1904, in perfect running order; extra set with top, oil cups, lamps, baskets, etc., $4,000; guaranteed demonstration; price $1,650. Address M. Marchouse, Columbus, Ohio.

JACKSON cars, 2-cylinder, 20-H. P., $1,250; 4-cylinder, 40-H. P., $2,000. The Jackson Agency, 142-152 West 29th St. 'Phone 1716 Madison Sq., New York City.

Situations Wanted

Chauffeurs desiring positions can do no better than to let the fact be known by a "Motor Messenger" in this column at the rate of five cents a word.

EXPERIENCED five years as chauffeur in the city. Will run electric for private party or company. E. J. McDonough, 2094 8th Ave., New York City.

LICENSED chauffeur, who has worked fifteen years with previous employer, has had six months' experience in automobile shop, thoroughly understands the way; wants job with private party. John Leroy, 348 East 77th St., New York City.

EXPERIENCED man, gentlemanly, 35 years old, has a family, wishes a position as chauffeur at once. Will go anywhere. Worked nine years in last place. Perfectly sober, industrious and competent. Frederick Wigelius, 5318 9th Ave., Brooklyn, N. Y.

YOUNG chauffeur, will go anywhere on a job, as driver and repairman; moderate salary. Nicholas Von Husen, 334 West 43d St., New York City.

GRADUATE chauffeur, now running electric for delivery wagon, desires position as gasoline car for the winter. Would like the south, but anywhere will do. Any wages. Chas. Covert, 229 West 128th St., New York City.

CHAUFFEUR, competent man, desires position on gasoline car; three years' experience. References. F. E. Skinner, 146 Lincoln St., Astoria, L. I.

MECHANIC, 28, employed during day, desires to devote four or five evenings each week to familiarizing himself with the construction and operating of automobiles. Address Mechanic, Box 34, care "Motor."

CHAUFFEUR, licensed, experience on all cars. Have been four years in the city and on the road. L. Vollmar, 133 West 52d St., New York City.

PREFER a position on locomobile. Worked in factory three years. Am well trained as Gasoline and White steamer. Good references. Sober and single. Wages $90 and expenses. H. J. Bertrand, 349 Hamilton St., Long Island City.

EXPERIENCE of four years enables me to run any kind of gasoline car. Wages $25 a week. Will go anywhere. F. E., 178 East 87th St., New York City.

AMERICAN chauffeur, with technical training, experienced mechanic, licensed, safe, sober, industrious, thoroughly competent to properly make all necessary repairs. E. B. B., 136 E. 126 St. care of Motor, New York City.

CHAUFFEUR wants position. Machine shop experience. Licensed, sober, references. No objection to country. A. R. Peterson, 308 West 31th St., New York City.

GERMAN, graduate, licensed, wants job as driver and repairman. Moderate salary. J. Kolnski, 36 West 131th St., New York City.

CHAUFFEUR, good references. Familiar with Panhard and Daimler. 2½ months' experience. A. Strumpfer, Creedmoor, L. I.

HAVE worked on Wayne, Ford, auto car, carbon and others. Four years' experience. Moderate salary. Will go anywhere. Redner Edison, 310 West 124th St., New York City.

YANKEE, seven years' experience, will go anywhere as chauffeur. Am driven every car. L. B. Winnapaw, Princess Bay, Staten Island, N. Y.

EXPERIENCED chauffeur, seven years on all kinds of electric vehicles, will go anywhere for good pay. Prefers job in New York City. Good references. Francis J. Fitzgerald, 422 West 57th St., care of Alexander, New York City.

CHAUFFEUR, licensed, strictly temperate, two or four cycle engines, foreign or American cars. Familiar with roads of Long Island and vicinity. References. James E. Van Vorst, Box 125, Roslyn, L. I.

AMERICAN, chauffeur, handy at making repairs, in last position nineteen years, wants position. Peerless, Mercedes or Hautier. Frank Meyers, 17 Stuyvesant St., New York City.

Sales Manager

An experienced Automobile and Motor Vehicle Sales Manager, of ability, address, force and reputation, is open for engagement where opportunity is large or can be made so. Thoroughly informed on construction. Favors Commercial Motor Vehicle development.

SALES MANAGER, care MOTOR.

CHAUFFEUR.—Am employed, but prefer a change, for good reasons. Good references. H. C. Grosman, 1179 Putnam Ave., Brooklyn.

LICENSED chauffeur; can run any gasolene car; two years' experience; salary $80. J. K., 58 West Twenty-ninth St., New York City.

YOUNG German, graduate of auto school, will come for $15 per week; has family; wants experience. Newberger, 327 Bloomfield St., Hoboken, N.

COLORED boy desires position; practical experience on American and foreign cars; don't drink; country or city; all gasolene cars. Andrew Woods, 151 West 33d St.

CHAUFFEUR.—First-class machinist, and with good road experience; salary $20. Chas Rambler, Winton or Sarchmont; want $100 and expenses. Jacob Rateloff, Berlin, Conn.

CHAUFFEUR.—American; practical; familiar with both American and French cars; desires position; references. Box 34, Montclair, N. J.

COLORED boy, 22 years old; 1½ years' experience on gasolene cars; will come for $60 during the winter; will take a position anywhere at all. Address John Shaw, East 14th St. and Avenue X, Sheepshead Bay, New York.

CHAUFFEUR, licensed, careful driver and good mechanic, wants position in private family; best references; speaks three languages. Stronli, 175 West 81st St., New York City.

LICENSED chauffeur, 3½ years' experience; any gasolene car; position anywhere; references. E. R. Casey, 107 West 94th St., New York City.

SCOTCH lad will come as chauffeur for $25 or less; refers to best New York people. R. Lindsay, 109 East 23d St., New York City.

IRISH-AMERICAN, 27 years old, six months' experience, will work with or without wages; at moderate salary. Thos. Leary, 114 West 61st St., New York City.

AN refer to several judges as being honest and experienced; motorist; wants touring winter. H. A., 728 East 165th St., New York City.

CANADIAN.—Four years' experience on French and American cars; several good references; any car, anywhere. C. S. Lee, 302 West 45th St., New York City.

CHAUFFEUR.—Experienced in every branch of the work; wants a position with private party; lots of experience; best of references. H. A. W., Box 6, care of Motor.

AMERICAN, strong, two years' experience as chauffeur, wants position. Familiar with all cars. Good references; wishes to work. Will go anywhere. New York City. F. E. Cremin, 10 West 104th St., New York City.

EXPERT chauffeur, can run any car, looking for a job anywhere as repairman or driver. Wm. Bernett, 1060 Stebbins Ave., Bronx.

GERMAN-AMERICAN, experienced, wants a position with private party. Will take $60 and board and room. Herbert Stein, 1 West 8th St., N. Y. City.

GRADUATE chauffeur, absolutely the best references from former employers, can run American cars. Ambitious. A. Rizzo, 142 West 48th St., New York City.

COLORED chauffeur, experienced on Panhard, Mercedes, Renault, Mors and other French and American cars, wants position with first or private party. C. A. Pernell, 241 West 132d St., New York City.

MACHINIST, can run any kind of car; must have a steady job; will not drive unless he can run electric for a firm in New York City; wages $80. G. P. Hartmann, 11 Station St., Brooklyn.

YOUNG Jean, 28 years old, wants position as driver of large touring car; expert gas engine man and careful driver. Geo. L. Schultz, Mendota, Ill.

CHAUFFEUR, experienced on touring car, foreign or American, also a complete mechanic, over five years as driver and repairman; salary $100 and expenses. James Ward, 234 East 124th St., New York City.

CHAUFFEUR wants position in private family; must be chanical experience; also experience as driver; can run gasolene car; salary $80; licensed. A. P., 302 East 120th St., New York City.

CHAUFFEUR, American, aged 23, three years' shop experience, wishes position; would prefer position in South; references; salary $80. Charles Warley, 420 West 52d St., New York City.

PAUL TATJE, 66 Norwood Ave., Brooklyn, wants position as chauffeur for winter; seven years' experience; $15.

LICENSED chauffeur, experience in shop and on the road; can run all gasolene cars; ten years in last place. Thomas J. Donovan, 400 West 41st St., New York City.

YOUNG American who understands the mechanical construction of automobiles would like position to operate and care for car for private party; good references. F. H., Box 2, care of Motor.

I HAVE worked for the General Electric Company for fourteen years; am an experienced mechanic; am gentlemanly in appearance and of good character; I want a position in a factory or shop to prove my worth; wages no object; refer to the above for the best of references. R. C. M., 310 West 120th St., New York City.

HONEST, conscientious worker will work in factory for experience; fourteen years as machinist; wants to get job in automobile works. Milliman, 310 West 120th St., New York City.

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Help Wanted

Since all the best chauffeurs are regular readers of Motor, a "Motor Messenger" at fifty cents a word is the surest means of obtaining a satisfactory chauffeur.

THE first man from each garage in the United States who answers this ad will learn particulars as to how he can increase his income by just keeping his eyes open. Send stamp. D. K., care of MOTOR.

SALESMAN wanted to sell something to owners who intend selling their cars; sure sale, big commission; good chance to make something on the side; send stamp for reply. Address A. S. W., room 30, New York American Building, Columbus Circle, New York City.

THE CHAUFFEURS' MUTUAL BENEFIT SOCIETY OF AMERICA has just been formed; advantageous to chauffeurs and mechanics only; full information upon request; very important. C. M. B., Box 12, care of MOTOR.

Registration Bureau

For Chauffeurs and Mechanics

We Can Help

anyone looking for a position as chauffeur or mechanic. We register you and assist you to find the position you are looking for.

We also insert your adv. in "Motor"

All you have to do is to send us a two-cent stamp and we will send you full particulars and a registration blank.

Employers Take Notice!

We have men who will **pay you to let them work** for you and men who are **worth** big wages. Whoever you need, write us anyhow. It won't cost you anything.

Motor Registration Bureau

1789 Broadway, New York

Second-Hand Cars Wanted

Under this heading wants of second-hand cars for cash or exchange are inserted at the rate of five cents a word. Since Motor is read by all dealers in second-hand cars as well as by many private car owners then any other motoring paper, a "Motor Messenger" in this column is more certain to obtain for you just the car you want than any other kind of advertising.

WANTED.—A good second-hand Tonneau car and as late a model as possible. Must be one that is simple to run. A. J. Herz, 104 South 4th St., Waco, Tex.

AM interested in a Model C or B 1903 Winton. If there are any on the market at a reasonable price please advise of same. H. G. M., care of Motor, New York City.

WANTED.—Second-hand, four-passenger gasolene car; must be in perfect condition, and bargain for cash; give full description; how long run. A. J. Herz, Waco, Tex.

WANTED.—To purchase a car; Olds or Stanley steam car, model E, 1903. J. H. House, Glenfield, Lewis Co., N. Y.

WISH to buy touring car, complete, about 30 H. P., with wheel base of 61 inches. F. B. Gardner, Georgetown, S. C.

For Exchange

A new Department here to produce results. Every motorist has surplus accessories. Exchange them for something useful. Five cents a word.

FOR SALE.—Full set of engine blue prints, designed for a Buffalo firm; 40 H. P. Apply Box 60. E. T. Munson, 1200 Niagara St., Buffalo, N. Y.

WANTED.—To exchange; fine pacing mare for light gasolene touring car in A1 condition; description and breeding of mare on request. A. J. Hayes, Leroy, Minn.

TWIN-SCREW gasolene launch, 28½ feet; to exchange for two-seated gasolene auto. W. H. Davis, Fedesalsburg, Md.

$450 PIANO, electric runabout and cash to exchange for a second-hand touring car. For particulars address J. W. Nicholson, 114 N. Clinton, Rochester, N. Y.

Official Automobile Tourists' Guide

(RED BOOK)

The most comprehensive encyclopedia of automobiling published.

Thirty-seven thousand miles of beautiful tours over fine roads; a gazetteer of cities and towns, giving population, best hotel in each town, garage and supply men in each place and designation, whether it is railroad, telegraph or post-office point.

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PRICE $1.00 *Postpaid*

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Motor Car Supplies and Accessories

Under this heading are advertised, at the rate of five cents a word, all kinds of motor supplies, parts and accessories. Motor is more widely read by car owners than any other motoring paper, and is therefore the best medium in which to advertise motor car supplies.

AUTOMOBILE TIRES
BOUGHT, SOLD AND EXCHANGED.

WE make a specialty of dealing in second-hand tires, and carry on hand, at all times, all makes and all sizes, as well as inner tubes. We can sell from 25 to 40 per cent. from the new prices. We allow a 35 per cent. discount on all sizes of new tires. Times Square Automobile Co., 164 West 46th St., two doors east of Broadway, New York City.

AUTO TIRES AT HALF PRICES

A. H. KASNER
152 Church Street, New York City.

PERFECT AUTO CLOCKS.—Exquisite in design and workmanship. C. W. Little, 78 Cortlandt St., New York.

PROTECT YOUR AUTOMOBILE with a mud apron. A-Z Co., 462 Eleventh Ave., New York, N. Y. Call on or 'phone 2194 38th St.

HONEYCOMB radiators, underguards, hoods, tanks, aluminum brazing, sprocket covers, repairing of all kinds. A-Z Co., 462 Eleventh Ave., New York. Call or 'phone 2194 38th St.

Cars for Rent

Under this heading advertisements of motor cars and motor boats for hire are inserted at the rate of five cents a word. Every motorist nothing a car for rent should keep a "Motor Messenger" running in this column. Motor is the only motoring paper published that has any large circulation among that portion of the general public that does not own motor cars.

BOUTON MOTOR COMPANY.

AUTOMOBILE rental service; four-cylinder touring cars exclusively; garage and salesrooms. M. D. Bouton, president; Frederic A. Tanner, treasurer; James H. Scott, superintendent. 'Phone 2052 38th St. Address 110 West 41st St., New York City.

TOURING CAR FOR RENT.—Large private car by the hour, day or trip. James L. Magee, 1495 Broadway, Times Square, New York. 'Phone 1724 38th St.

AUTOS FOR RENT.—Day, hour or trip. M. J. Vozie, 154 West 43d St., New York, or 'Phone 6782 38th St.

FOR RENT.—Fine new Jackson cars. The Jackson Agency, 143 West 29th St., New York.

THE swellest autos to hire in New York are the new four-cylinder Packard touring cars. Private tours anywhere. Leave to the select trade of New York. F. Lauterbach, 1488 Broadway. 'Phone 2668 38th St., New York City.

Instruction

Under this heading are inserted, at the rate of five cents a word, all advertisements of resident and correspondence automobile and motor boat schools, as well as notices of motoring books and other publications.

AUTOMOBILE INSTRUCTION. — Only practical school of automobile instruction. Our courses fit you to become an experienced chauffeur with full knowledge of how to keep your machine in order. Thorough, practical work only. Chelsea School of Automobile Instruction, 318 West 37th St., New York City (near 10th Ave.). 'Phone 3061 38th St.

SCHOOL FOR CHAUFFEURS.—Ours is the original school of automobile instruction. Our unparalleled success has made many imitators. Be careful, thorough individual work under personal supervision of the manager we make every student not only an expert chauffeur, but a thoroughly competent mechanic able to make repairs on any machine and to keep it at all times in perfect order. Satisfaction guaranteed. Positions waiting. West Side Automobile Transportation School, 309 West 41st St., New York, N. Y.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS, Inc., 146 West 56th St., New York City.—A high grade school of instruction for chauffeurs and automobile owners. Day and evening classes. Now enrolling students. Write, call or 'phone for particulars. Telephone 4314 Columbus.

N. Y. Official Automobile Register and Tourists' Guide

(RED BOOK)

A LIST of the owners of Automobiles with make of machine, touring routes, laws, clubs, gazetteer of cities and towns, all garages and repair men, hotels with rates, beautifully bound, pocket size.

Price, $1.00

Now ready for distribution

The HALL PUBLISHING CO

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MOTOR STATION DIRECTORY

New York City

AUTOMOBILE ARCADE, 49th St. and Broadway.
AUTOMOBILE EXCHANGE, The, STORAGE Co., 132-136 West 58th St.
A. G. SPALDING & BROS., 29-31 West 42d St.
A. F. RIKER, 200 West 70th St.
ALCO TRUCK TRANSPORTATION CO., 300 West 41st St.
ACME MOTOR CAR, 941-943 Eighth Ave.
AUTOMOBILE RENTING & TOURING CAR CO.; Hartog & Rappleyea, props., 304 West 54th St. 'Phone 1140 Columbus.
AUTOMOBILE DEPOT, INC., 231-235 West Fortieth St. 'Phones 1146 & 1147 Thirty-eighth St.
AUTOMOBILE TOURS, 3 Park Pl. 'Phone 6050 Cortlandt.
AUTOMOBILES PAINTED, REPAIRED AND UPHOLSTERED by William Beach & Son, 346 West 23d St., New York City. 'Phone 8484 Chelsea.
AUTO-C, OF MOTORING, 83 Nassau St. 'Phone 304 Cortlandt.
AUTOMOBILE SCHOOL OF NEW YORK, Forty-ninth St. and Broadway. 'Phone 3321 Columbus.
AUTO IMPORT CO., 1786 Broadway. 'Phone 4637-4638 Columbus.
AUTOMOBILE HIRE AND SALES CO., 231-235 West 39th St. 'Phone 114 38th.
BEITLER, JESSE, Special Agent Foreign Cars, 1 West Thirty-fourth St. 'Phone 1146 Thirty-fourth.
BLUE RIBBON GARAGE, 112-114 East Seventy-fifth St. 'Phone 4130 Lenox.
BLACK DIAMOND AUTO CO., Lord's Court Bldg., 27 William St.
BRADLEY JOHNSON AUTOMOBILE CO., 120 East 84th St. 'Phone 4831 Lenox.
BROADWAY AUTO EXCHANGE, 137 West 48th St. Second-hand automobiles. 'Phone 8363-64-65 38th St.
CADILLAC COMPANY OF NEW YORK, 131 West 58th St.
COLE & WOOP, Automobile Aluminum Bodies, 48-54 West 62d St. 'Phone 211 Columbus.
CHELSEA AUTO STORAGE CO., 516-520 West 57th St. 'Phone 4284 Col.
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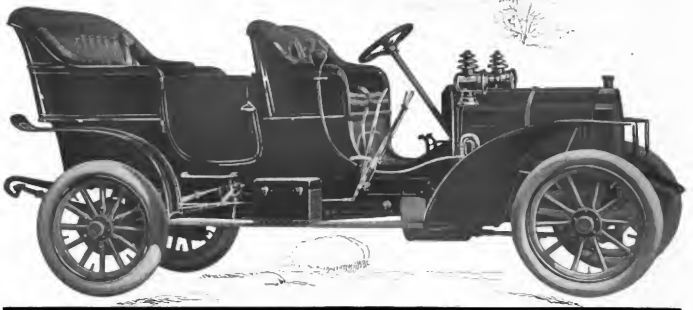
HISTORIC CLAREMONT. — America's famous roadhouse; open every day in the year. Riverside Drive, New York, N. Y. 'Phones 421 and 422 Morningside.

HOTEL GRAMATAN, Lawrence Park, Bronxville, N. Y.—Opened June 1 and will remain open all the year. Most palatial hotel near New York; 15 miles from Grand Central Station; golf, tennis, riding, driving, etc.; refined, quiet, exclusive; cuisine, and; fine orchestra; long-distance telephone in every room; booklet. J. J. Lanzin Co., proprietors; also proprietors Garden City Hotel, Long Island.

HUBER'S CASINO.—Open day and evening; music; one block from Auto Station, 182d St. and Jerome Ave., New York City.

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Packard



A car so good as the Packard could not be the result of one year's work nor the creation of one man's brain.

It is only possible by the cumulative effort year after year of a great organization of skilled specialists.

It is like no other car.
It can be measured by no other standards.
It is a combination of perfect parts, every one of which reflects the pride of the man who made it.

Price with Standard Equipment, $4,000, f. o. b. Detroit.
For our catalog and name of nearest Packard dealer, address

PACKARD MOTOR CAR CO.

DETROIT, MICH.

Member Association Licensed Automobile Manufacturers Dept. 6 **New York Branch, 1540 Broadway**

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WINTON



Let's Look at the Engine

The Engine Is the Vital Part of the Automobile and Must Be Good.

This Winton Model K engine has four cylinders. Therefore, it is *producing power all the time*—not half the time, like a two-cylinder, nor one-fourth the time like a one-cylinder. It is vertical, in the prevailing style, and water cooled, so that it will not *burn up* from its own heat, nor consume oil wastefully. Its 4 3-4-inch bore and 5-inch stroke might mean 40-horsepower, according to some estimates; but we are conservative and call it 30. That's all the power Model K needs to climb any traffic-used hill with ease or to make a speed within safe limits. Cylinders are cast in pairs; that gives greater stability of construction than four separate cylinders, and permits perfect cooling. These cylinders are made of exceptionally tough stock, and are ground from *six to twelve times*, so that each cylinder is a *perfect circle*. Pistons and eccentric piston rings are likewise accurately ground. And the result is that each Model K piston fits each Model K cylinder perfectly. Consequently there is no leak of compression—that is, no waste of power. You know how distressing it is to drive on a wet asphalt pavement where the wheels can't get proper traction, but slip, slip, slip? Well, that's loss of power, just like the loss through wasted compression. Model K's perfectly ground cylinders and pistons also prevent the friction, scraping, grinding and scoring that ruin so many unground cylinders and pistons. Therefore, all this means to you money saved through economic use of fuel and power, and through long-lived machinery.

Model K's crank shafts are ultra-powerful. Made of special treated carbon steel, and tested to 95,000 pounds to the square inch. Likely to last forever.

Bearing surfaces are accurate and substantial. Cam-shaft gears are inclosed, insuring protection and perfect lubrication.

Lubrication is one of Model K's strong points. Some makers use splash or dip or guess-work lubrication. We don't. On Model K oil is fed *regularly and positively* to each piston and each crank-shaft bearing, direct from the Hill Precision Oiler (of which we will send a detailed description upon request). This oiler has the force of a *catapult* and the accuracy of mathematics. There is always a film of oil around the pistons and in all the bearings, causing the engine to run "sweetly" and with no wearing friction whatever.

Good lubrication, perfect fitting bearings, and the use of rawhide gears between metal gears, and of a sound-deadening dust shield, make Model K's engine delightfully quiet.

Then, too, if for any reason you want to get at Model K's working parts, you simply lift a cover, and there you are. You can remove pistons, connecting rods, crank-shaft, etc., without tearing down the car, using a derrick, or groveling around in a pit. Just unbolt the left half of the aluminum crank-case and all these parts are ready for removal. And remember that you take out these parts while you stand at the car side; you do not detach motor accessories (not even a spark plug); you do not detach cylinders from crank-case; you remove nothing but the side of the crank-case and the parts you want to take out. Simplest thing in automobile construction.

MODEL K—Four-cylinder, vertical, water-cooled. 4¾ in. bore, 5 in. stroke. Shaft drive. Individual clutch transmission. Winton Air Governor. Most approved system of lubrication, ignition and carburization. Seats six. $2,500 f. o. b. Cleveland. Complete details set forth in catalog No. 2.

THE WINTON MOTOR CARRIAGE CO.

CLEVELAND, O., U. S. A.

Member A. L. A. M.

BLANCHARD PRESS, NEW YORK.

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VOL. V. No. 3 DECEMBER, 1905 25 CENTS

XMAS MOTOR



"Franklin Horse-Power"

"Franklin horse-power" is a new expression and a necessary one. We use it to protect ourselves and the public.

Every automobile buyer ought to know that "Franklin horse-power" is an absolutely different standard from ordinary horse-power. It means more and *does* more—a great deal more.

Twelve "Franklin horse-power" does what would require 20 of other horse-power to do. Twenty "Franklin horse-power" equals 30 of any other. Thirty "Franklin horse-power" equals 45 or more of the average American sort.

This is so because the Franklin engine—bore for bore—delivers more power to the rear wheels than any other automobile motor; and because this power is given full effect by the entire Franklin design and construction.

A bigger charge is admitted to the combustion chamber because of the low temperature produced by the Franklin auxiliary exhaust.
The explosion is consequently *stronger;* and its force is highly concentrated by the small interior surface of the Franklin motor.
The auxiliary exhaust—a port valve at the bottom of the stroke, opens before the main exhaust operates; completely *relieving back pressure* and maintaining the temperature combustion chamber at the temperature of highest efficiency.
The immensely large exterior air-cooled surface radiates the remaining unused heat with great rapidity.
The *cylinders* are cast to a special analysis of peculiarly *tough, close-grained* iron, and are of *uniform* thickness and perfectly seasoned and ground.
There is no such waste of energy as in an ordinary motor. No such dissipation of force within the engine as occurs with a large interior surface; no leakage of compression from porous metal or imperfectly fitting pistons. No such extremes of temperature with the consequent ill effects.

The Franklin motor needs no "warming up" to its work. It cannot freeze. It never overheats.

It begins making big power from the word "go"; makes it all the time, and delivers it to the rear wheels.
The simple, correct design, the strong, flexible, light-weight construction of Franklin cars carry into full effect the high power-delivery of the motor, and transform it into a finished ability, greater than that of any other motor in any other car.

RATED POWER IS AN ENTIRELY DIFFERENT THING FROM ACTUAL POWER

Rating is merely a calculation of what an engine of given size *ought* to do.
Power is what it really does. And that depends upon many things besides its size.
"Franklin horse-power" is what the Franklin engine actually does.

Nearly all the leading American manufacturers, except ourselves, in order to meet the demand for power, are this year building larger and heavier cars, with larger engines and increased horse-power rating.

These ratings (35, 40, 45 and even 50) are honest, but they are decidedly misleading.

Many motorists have been greatly disappointed and they will continue to be disappointed in the performance of their cars so long as horse-power is graded by figures rather than by ability.

You can, to a certain extent, get increased power by increasing an engine's size and weight. But this means also increasing the size and weight of the whole car. This cuts down what the power will do, and adds to the expense of doing it.

We prefer to keep down the weight and the mere rating of our engines, while we increase their actual power and the actual efficiency of our cars by refined engineering and light, strong, flexible construction.

We thus insure greater comfort, safety and real ability at less expense.

Franklin cars are roomy and capacious. They have no water-cooling complications, weight or trouble. Their wood sills and perfect springs make them easy riding and safe when driven at speed on rough roads.

They are economical of oil, fuel, repairs and particularly tires.

They not only do more than any other cars of their price, but they do it for far less operating and maintenance cost.

It was a 10 "Franklin horse-power" car that two years ago cut down the record between San Francisco and New York from 61 to 33 days. No other car has touched this record since, though several of higher rating tried it.
In the famous Long Island two-day Economy contest a 10 "Franklin horse-power," carrying four people, won the trophy over ten other cars, all of higher rating—up to 20, 30 and 40 horse-power. In racing, hill-climbing, touring—no matter what the test is—

FRANKLINS DO MORE, DOLLAR FOR DOLLAR, THAN ANY OTHER CAR

RATING OR ABILITY: WHICH DO YOU WANT?

A heavy car with a heavy engine to drag it and heavy expense to keep it going; or, a strong, light-built, powerful car—with every ounce of its energy put into action, doing the same work—and more, on a lower rating for less cost?
If you want to be sure of it, try it at a Franklin dealer's.

FOUR-CYLINDER RUNABOUT. FOUR- AND SIX-CYLINDER TOURING CARS

Send for Books

H. H. FRANKLIN MFG. COMPANY, Syracuse, N. Y. *M.A.L.A.M.*

"The Motor Car of the Future"

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The 1906 Mercedes

By a recent contract with The Mercedes Import Co., sole representatives of E. L. Charley, Paris, we have become exclusive licensees for 1906 Mercedes automobiles in the United States and Canada. The number of new models for importation is limited and orders are now being booked. Orders will be filled in rotation. Every Mercedes we import and sell is supplied with Selden & Daimler license plates.



A TYPICAL MERCEDES CAR
The World's Standard in Automobiles

NEW FEATURES FOR 1906
DIRECT DRIVE ON THE FOURTH SPEED
TRANSMISSION GEAR INCLOSED IN FRONT
AXLES 1½ inch higher
Stronger springs for American roads
H.P. Ball Elliptic
New oiling system for clutch inclosed
Exhaust box outside pan

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1906 Panhard

THE hackneyed phrase "old and reliable" seems to be the fittest expression available to describe the Panhard automobile. For years this car has been standard both in design and efficiency.





Chassis—Width—90 C. M., instead of 85 C. M., as formerly.
Clutch—Metal disk instead of leather.
Axle—High for American Roads; full ball bearing.
Pump—Gear driven.



Magneto—Under the hood and on direct drive instead of by chain.
Pedals—Push style (Mercedes) instead of present style.
Steering Post—Inclined as to be in direct line with power.





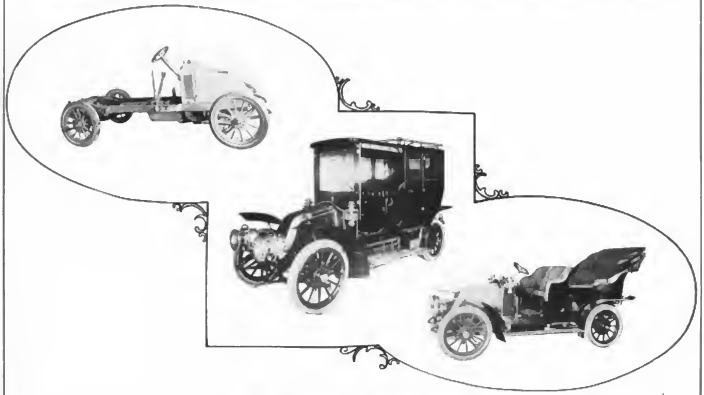
It has changed comparatively little as the years passed and it still retains its enviable position in the van of really high grade cars. However, improvements in details are constantly being made as fast as they have been proven to be actual advances and some of them will be found in the models for the coming year.

Smith & Mabley

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1906 Renault

FOR city, park and suburban use—in fact for all uses except indiscriminate touring—the light, noiseless, easy operating Renault is the car par excellence. It will be furnished the coming year in 10-14 b. p.; 14-20 b. p.; 20-30 b. p. and 40 b. p. The 10-14 b. p. will appear for the first time with four cylinders and the forty b. p. is an absolutely new car. Lengths are 2m. 20; 2m. 45; 2m. 55 and 2m. 70. We have ordered a specially selected lot of early numbers of these cars in order to meet the demand of finished cars by the opening of spring.



A Few Questions

Why are Mercedes, Panhard, and Renault cars so hard to get when so many other foreign makes can be had for the asking?

Why were 35% more Mercedes cars imported into the United States in 1905 than any other foreign made car?

Why does the Panhard stand next, and the Renault next, in respect to numbers imported into this country?

Why do purchasers of the S. & M. Simplex automobile swear by it as "the American Car that has arrived?"

The answers to these questions are obvious. The intending purchaser who verifies each one will be on the right track for 1906.

Smith & Mabley

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1906 S. & M. Simplex

THE Simplex is the natural outgrowth of a demand for a domestic car as high in quality as the best foreign cars, but lower in price. It came because many American patrons who are good judges of workmanship, material and efficiency generally, were disinclined to pay foreign prices.

And the Simplex has filled every requirement. Built by men who for years have handled the cars recognized as the world's standard, it fully equals in performance, durability and appearance the best automobiles from abroad. This is due in part to the fact that much of its material is imported and is the same as used in the best foreign cars. All tests of materials are greater than those usually given by other American builders—fully equal to those made abroad. It is perfectly adapted to all American conditions and its price is simply the price of an A-1 car without the addition of the import duty. It most successfully combines the convenience and lasting qualities of the Panhard with the ease, style, speed and durability of the Mercedes.

In the 1906 Model the h. p. will remain the same—30. Lengths will be 2m. 30; 2m. 40 and 2m. 50.



The great success that attended the appearance of the Simplex Motor in automobiles naturally suggested its use in boats. The real advantages of the S. & M. Simplex Motor appear most conspicuously in luxurious cruising crafts of every description. The size and economy of the motor give twice the available space in a boat of equal size with an old-fashioned motor. Any auto boat fitted out with an S. & M. Simplex motor marks a distinct advance in the science of motor boat building.



Simplex III, shown herewith, is entirely our own product. The hull is constructed in the best possible manner of Spanish Cedar. The motor is our stock machine and runs without noise or vibration. It is under perfect control and has a range of speed of from 5 to 20 miles per hour. Length 32 feet, equipped with a four cylinder Simplex motor of 30 h. p. The boat will seat eight people and the price is Four Thousand Dollars.

Smith & Mabley

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FIRST GOLD MEDAL
Highest Award
3 Consecutive Years
1902-1903-1904
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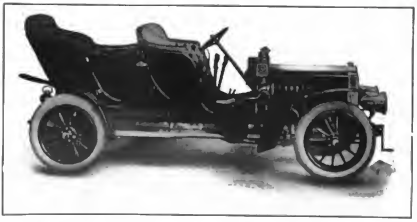
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Repair Shop for Mors Cars. Complete stock of replacements

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Intending purchasers will find a demonstration of the new Mors cars very interesting

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One of Our Three New Models

MOTOR 4-Cylinder 26-28-H. P.
DRIVE Shaft Bevel Gear.
FRAME Pressed Steel.
WHEELS 32 x 4.
WHEEL BASE 101 inches.
TRANSMISSION Sliding Gear.
FRONT AXLE Solid-forged.
GROUND PARTS All Cylinders Pistons, Piston Ring, Crank Shaft Valves, Universal Coupling and Transmission Shafts.
EQUIPMENT Five Lamps, Horn Tools and Storage Battery.

We also have an 18-H. P., Two-cylinder Touring Car with Detachable Side-door Tonneau, listing at $1,100--and a Runabout 12-H. P. at $800.

Write us for complete details and agency proposition

C. H. BLOMSTROM MOTOR CO.

DETROIT, MICH.

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MICHELIN TIRES have won every important race in America and Europe for the last ten years.

MICHELIN TIRES free their users from tire worry.

MICHELIN TIRES do not rim-cut.

These three results are due to three reasons. Michelin Tires contain the best tire material in the world. They are the most carefully made. They are made by the most skilled workmen in France. :: :: :: ::

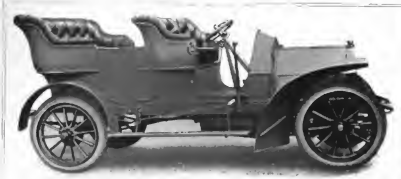
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Humber

"IN ALL THE WORLD UNEQUALLED"



10-20 H.P. 4 Cylinder BEESTON HUMBER. Price, £2,280 : 480 guineas net.

A FEW PERFORMANCES

A.C.G.B.I. Hill-climbing Trials at South Hastings (in Class B.) . . . FIRST
SCOTTISH Reliability Trials.—The Beeston Humber went right through without losing a mark.
SOMERSET A.C. Hill-climbing Competition. Beeston Humber FIRST (covering the half-mile of heavy gradient in 1-min. 13⅘-sec.
NOTTINGHAM A.C. Reliability Trials.—Beeston Humber Car won the Foster Cup (for the second time in succession), defeating a powerful array of competitors.
&c. &c. &c.

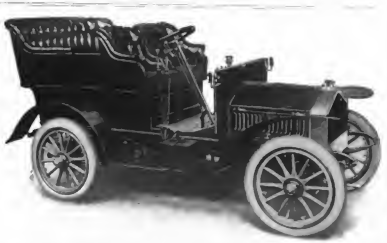
We shall be exhibiting at the Salon d'Automobile, Paris, December 8-24, and shall be

Prepared to Appoint Agents for All Parts of America

where we are not already represented.

A FEW PERFORMANCES

A.C.G.B.I. Hill-climbing Trials at South Hastings (in Class A.) . . . FIRST
MANCHESTER Motor Club Hill Climb.—Coventry Car beat all comers.
SOUTH SHIELDS A.C. Hill-climbing Trials.—Defeated all comers.
EDINBURGH Motor Club Hill Climb.—FIRST PRIZE for best time.
BRIGHTON Week—1-mile Scratch Race—FIRST, beating cars up to 20 H.P.
At BLACKPOOL the Coventry Humber won the Lancashire Handicap, and was the smallest car competing.
At SKEGNESS, in the Mile Scratch Race the Coventry Humber proved an easy winner.
SCOTTISH Reliability Trials.—Coventry Humber defeated many larger and more expensive cars, and was proved very economical in the consumption of petrol.
&c. &c. &c.



8-10 H.P. 4 Cylinder COVENTRY HUMBER. Price, £1,275 : 255 guineas net.

To make appointments for the Salon in advance, write to

HUMBER Ltd. BEESTON (Notts), ENGLAND

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F·I·A·T



Lancia in his 110 H. P. "FIAT" in the Vanderbilt Cup Race
"The Fastest Car in the World."—*New York Herald*

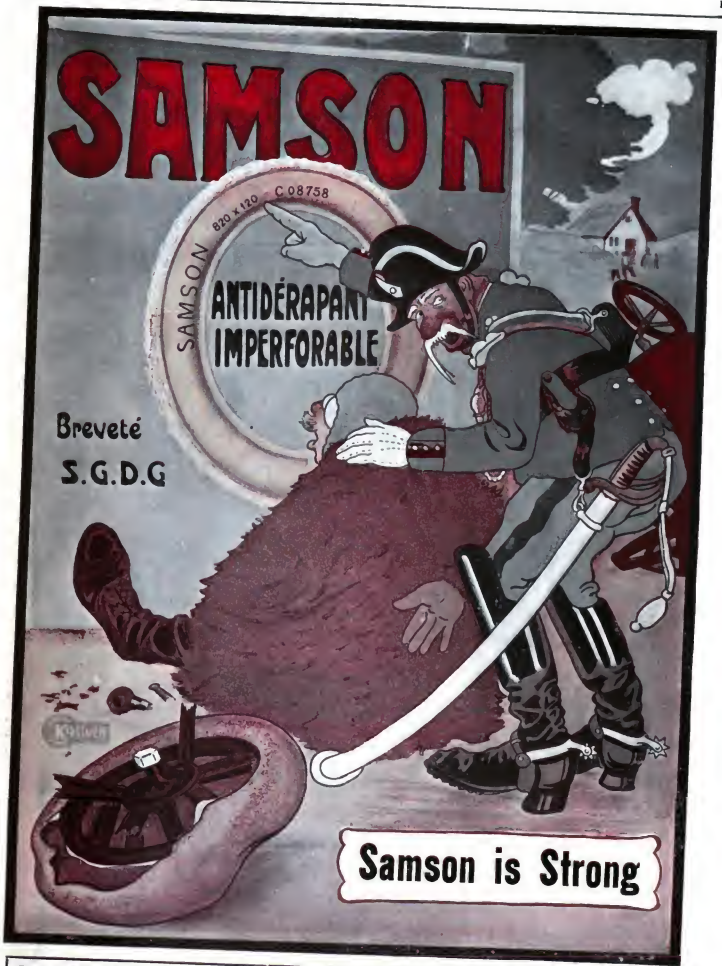
In the Vanderbilt Cup Race, Lancia's "FIAT," despite the frightful strain which it was subjected to while making the wonderful record of *72 miles an hour for 220 miles, varied scarcely thirty seconds to the lap* throughout the entire race, until disabled by collision. Such reliability is characteristic of all "FIAT" Automobiles. We are receiving each week two or three of the famous FIATS and are therefore prepared to make prompt delivery of these cars, completely equipped and *ready for the road.* "FIAT" cars may be had with either closed or open bodies, the work of the very best European and American body designers. :: :: ::

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"The Maxwell"



16 H.P.
Touring Car
$1,450

"Perfectly Simple, Simply Perfect"

The essential requirements of a successful automobile are:

First, CAPABILITY **Third, DURABILITY**
Second, RELIABILITY **Fourth, ACCESSIBILITY**

All of the above characteristics will be found strongly developed in the MAXWELL motor cars. They are the causes which have operated to so phenomenally popularize them.

They are always ready, always go and always come home

The transmission and multiple disc clutch running on oil, the sure lubrication provided by the MAXWELL perfect oiling system, the almost entire absence of vibration, the smooth running qualities of every moving part and the high power for weight, produce a car the capability and reliability of which is equal to motor cars of much greater rated horse power and higher prices.

The **three-point suspension** method of supporting the motor in the frame, resulting in the elimination of strains, **the correctly proportioned strength, the long bearings, the metal body,** results in a car that will last a lifetime.

The motor being placed up front, under the hood, results in every part of the motor and transmission being accessible for adjustment and examination when the hood and transmission case cover are removed.

To the man who wishes a car that he can trust, one that will carry him over any grade of road in any weather, year in and year out, with practically no vibration, little noise and perfect safety; a car that has been built to meet the requirements of the average American Motorist over the average American Roads, and which DOES meet them; in short, to one who wishes an automobile in which there is "nothing to do but ride;" to such a man the MAXWELL is a realization of his ideal.

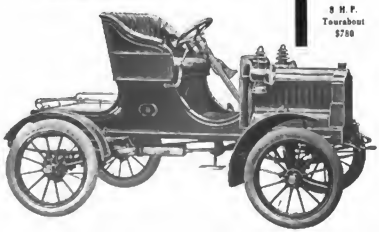
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Maxwell-Briscoe Motor Co.

Tarrytown, New York

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8 H.P.
Tourabout
$780

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Darracq



Coupe Limousine, 1906 Model
Particularly adapted to Winter use

Deeds, Not Words Sell the Darracq

No car in the market can give such splendid proof of its superlative qualities. We can convince you by past performances and by present demonstrations that the Darracq car in its every detail stands to-day as absolutely the highest type of Automobile construction.

Victorious in the Vanderbilt Cup Races
Models from $5,000 to $9,000

Now in stock, ready for shipment, cars of 15-20 h.p., 24-28 h.p., 30-35 h.p. Any part of the Darracq replaced from stock within 24 hours.

American Darracq Automobile Co.
CONTROLLED BY F. A. LAROCHE COMPANY
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Licensed Importers Under Selden Patent (No 549,160)

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A MODERN FRENCH POSTER AD.



Why the Devil don't you have DIETZ Lamps?

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MOTOR'S INFORMATION BUREAU

There are two sections to every magazine—the editorial and the advertising. Neither is more important than the other. The reader buys a magazine for the interest which the editorial section has for him, and he expects the advertising section to be an *information bureau* for his needs.

The advertising pages of this issue of MOTOR should be as carefully read as the text pages, because they are its readers' *information bureau*. If you wish to buy a motor-car, you will find the standard makes advertised in MOTOR. If you wish tires, lamps, motor-car accessories, etc., you will find only the standard makes of anything represented in MOTOR'S advertising pages.

Never hesitate to write to advertisers for more complete information than the advertisements contain. You incur no obligation, if you do. And when you do, kindly mention MOTOR.

For information about anything not in MOTOR, write us and we will see that you are informed.

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A Practical Plan for the Sale and Purchase of Second-Hand Cars

Though many intending buyers of second-hand cars defer purchasing till spring, there are several advantages in buying in the autumn or early winter.

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Fill out the coupon below and send it to us with $1, sent at our risk.

Fill out—Tear out—Mail to-day.

Motor Bureau,
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Enclosed find $1, for which please enter on your list the car described below. I understand that you will without additional charge give this car a 20 word "For Sale" advertisement in Motor, and also quote it to all prospective purchasers who are looking for a car of the following description:

Name of Car

Model or Date

H. P. No. Cyl's

Asking price

Extras

Remarks on condition, etc. (Make these as specific as possible)

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State whether you want gasolene, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

Second-Hand Cars for Sale

Under this heading second-hand cars are advertised for sale at the rate of five cents a word, cash in advance. These columns are open to dealers as well as to owners of private cars. If you have a car for sale, you can reach more prospective purchasers by a "Motor Messenger" in Motor than through any other Am. an medium.

BUYERS, NOTICE! Don't buy double opposed cylinder car before writing me. Have nothing to sell, but may save you money and trouble. Dr. J. G. Bouvier, Jeanerette, La.

ORIENT buckboard for sale or trade; excellent condition. Address Box 38, Royersford, Pa.

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OLDSMOBILE, wood wheels, Dunlop detachable tires, Holley carburetor, large hamper and fine top; in the finest condition; price $260. Address Box 506, Reading, Pa.

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FOR SALE.—Three White cars, 1905 model; one practically new; with canopy top and baskets; $2,000; one with cape top and searchlights, run about 4,000 miles, $1,600; one with searchlights, run about 6,000 miles, $1,400. Apply White Automobile Co., 11 Dorrance St., Providence, R. I.

FOR SALE.—A 1905 Pheips, four-cylinder touring car, side entrance, 25 to 30-H. P.; 108-inch wheelbase; handsome, roomy car; nearly new; and in first-class condition; wheels, 32 by 4 inches. Address Charles W. Briggs, 173 Broadway, Norwich, Conn.

FOR second-hand auto cart see A. G. Spaulding & Co., 31 West 23rd St., New York City.

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FOR SALE.—Two Knox observation cars; 14 passengers; cars used three months on Paul Revere route; are in perfect running order; company buys large autos. Apply to Lexington and Concord Sight Seeing Company, Lexington, Mass.

OLDSMOBILE runabout, model 1903; top, extra seat, Corbett horn, very good condition; will sell for $300. Carle J. Blenner, 38 West 37th St., New York City.

OLDSMOBILE runabout; will sell for $300 or exchange. Write for particulars. C. J. Blenner, 38 West 37th St., New York City.

FOR SALE.—Hayes-Apperson, Model M, 20-H. P., double opposed engine, five-passenger car. Purchased July, 1905, but motor on which all the 1906 improvements. Guaranteed in A1 condition. Will demonstrate any length of time and condition to prove it. J. F. Ross, Louisville Hotel, Louisville, Ky.

FOR SALE.—1905 Northern touring car. Fully equipped. Write to; full particulars. J. F. Kellogg, Ayon, N. Y.

MITCHELL.—Runabout, $750. Touring car, $1,500. Immediate delivery. Motor Vehicle Repair and Storage Co., 121-123 West 31st St., New York City, New York Distributers.

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We are the largest dealers of NEW and SECOND-HAND automobiles in the United States. Complete bargain sheet sent upon request. We name below a FEW of our bargains. No matter what you are looking for, you are sure to find it in our place.

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No. 1800. Brand new AUTOCAR, never been run, $1,400. 4-cylinder.

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No. 1318. LOCOMOBILE Steam Runabout, in fine condition, $150.

No. 1324. NORTHERN Runabout, with all new tires, improved Dunlops, in fine condition, $150.

No. 1329-1903. OLDSMOBILE with dos-a-dos seat, in first-class condition, in exceptionally good condition, $250.

No. 1333. Model "B" CADILLAC, like new, $500.

No. 1701. Model "F" CADILLAC, side entrance, machine just like new, $600.

No. 1804-1905. Model "C" WINTON, with Cape Cart top, in fine condition, $900.

No. 1805. Model "B" WINTON, 1905 machine, like new, $1750. This machine is in perfect condition.

No. 1806-1904. WINTON, with top and glass front, in perfect condition, $750.

No. 1807. Model "A" CADILLAC, with detachable tonneau, extra tail board, detachable tires, 1904 model, $1350.

No. 1808. Model "A" CADILLAC, 1903 model, $1250.

No. 1809. Two-cylinder KNOX Touring Car with top, $750.

No. 1810. KNOX Runabout with folding front seat, late model, $500.

These are only a FEW of our BARGAINS. Complete bargain sheet sent upon request.

Times Square Automobile Company
164 West 46th Street,
1 to 3 Doors East of Broadway **NEW YORK CITY**

FOR SALE.—Packard model L, four-cylinder, rear entrance; perfect condition; new last November; run but 1,500 miles; price $2,000; also Packard four-cylinder, model N, side entrance; perfect condition; new in June; run 2,000 miles, price $2,100; so perfect is the condition of both machines that they can scarcely be told from new cars. Address Theodore Strawn, Ottawa, Ill.

BARGAIN.—1904 White Steamer, in first-class condition; looks like new nearly, not much used; thoroughly reliable. Buy the best. A. L. Wilson, 103 Miller Ave., Columbus, Ohio.

FOR SALE.—1905 Pope-Toledo, Type 8; 30 H. P.; run about 2,000 miles; fine condition, completely equipped; Lamson tires on rear wheels, extra Continental tires, six inner tubes, extension top, searchlight, lamps, extra Witherbee battery, Jones speedometer, tool kit, rear baggage carrier and baskets, etc. Inquire Robt. Martin, Blue Ribbon Garage, 114 East 75th St., New York.

FOR SALE.—Handsomely finished Chelsea; cost $1,600; engine guaranteed had shaper; will sell for $750 cash. Cassard, Box 607, Baltimore, Md.

MODEL C, 1906 Winston, four-cylinder engine in front, rear top, Rushmore searchlight and two Gray & Davis oil lamps, Gabriel horn; cost $2,000; sell for $1,350. L. A. Deggimer, 1345 Madison Ave., Covington, Ky.

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$2,500 FRENCH Darracq touneau automobile for sale $1500 or less; it is in excellent condition; demonstration given. Address "Darracq," P. O. Box 147, New York City.

1905 LOCOMOBILE, 15 to 20 H. P.; very good condition; thirty run only 1,000 miles; practically new; sell for $2,500. C. B. C., 470 East 137th St., Brooklyn.

FOR SALE—24 H. P. Panhard, two bodies; in spleudid condition; full equipment, top, slip covers, speedometer, leathers, basket, etc.; this is an unusual opportunity. Address E. C., Room 81, 140 West 42d St., New York.

PACKARD, Model L, 1904; four-cylinder; 24 H. P.; perfect condition; has over $400 worth of extras; will sell for $1,200, or would take a first-class runabout in trade. F. W. Harris, care of First National Bank, Chamapign, Ill.

HAYNES-APPERSON, 1904; two-passenger; two-cylinder; 14-H. P.; opposed motor; three-speed transmission; tools and extras; just overhauled and all worn parts replaced by new; only run 1,500 miles; $600 cash. Wm. G. Dobbs, 149 South Division St., Auburn, N. Y.

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Overcrowded and forced to turn away cars, the make of a noted 'er. With the consent of owners we have picked the following cars which we will let go at the first reasonable bid.

Franklin, 4 cylinder, air cooled runabout.
Mora Tonneau, 4 cylinder.
Royal Tonneau, 4 cylinder, canopy top.
National Tonneau, 4 cylinder, 20 h.p.
Packard Tonneau, canopy top.
Pierce Arrow Tonneau, headlights, etc.
Pope-Toledo Tonneau, cape top.
White Steam Runabout, extra top.
Columbia, 4 cylinder tonneau.
Peerless, 2 cylinder tonneau.
Cadillac Tonneau, Model "A."
Mercedes Tonneau, 4 cylinder, elegant condition.
Ajax Electric Runabout, new batteries.
Long Distance Runabout, 7 h.p.
Winton Surrey, newly painted.
Decauville Tonneau, 12 h.p.
Stanley Steamer, carries 2 or 4.
White Steam Tonneau, canopy top.
Woods Electric Runabout, new batteries.

Make a bid on any of the above cars. If within the bounds of reason we will put them on memorandum to accede to your terms. This is practically a chance to get a desirable auto at your own figure. If none of the cars advertised above suit you, send for list. We have over 250 on hand with the consent of owners, will try to quote you special prices.

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Largest Auto Dealers in the World
334-340 West 44th St., - New York City

FOUR-CYLINDER CADILLAC; never used; owner bought foreign car while waiting for delivery. Make me an offer. M. F. Ring, 215 N. Broad St., Philadelphia, Pa.

FORTY-H. P. THOMAS "FLYER"; used very little; perfect condition; new car of same make. W. Strimple, 215 N. Broad St., Philadelphia, Pa.

NATIONAL electric runabout in good condition, with lamps and top. Apply to F. Herbst, Wilmington, N. C.

TYPE F FRANKLIN, 1905; $1,400; used only a little. Auburn Automobile Co., Auburn, N. Y.

FOR SALE—Doctors' rigs; two Stevens-Duryea runabouts, about with tops; condition perfect; $700 and $450. 1655 Broadway, New York City.

JACKSON, $1,650; 20-H. P. tonneau, 1905, side entrance; condition perfect; make an offer. Jackson, 1655 Broadway, New York City.

FORTY-H. P. DE DIETRICH in perfect condition; side entrance; cost $10,500; will sacrifice; demonstration at any time. Gotham, 1655 Broadway.

PREMIER, air-cooled, and Ford cars; supplies. Utica Motor Co., 178 Lafayette St., Utica, N. Y.

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NINETY-H. P. MERCEDES FOR SALE.—Gordon Bennett racer; record of 39½ at Ormond, Fla.; Worcester hill climb, one mile, 1:09. For particulars, Decauville Automobile Co., 136 West 38th St., New York.

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FOR SALE—1850; Franklin; detachable tonneau, Rushmore lights; newly painted; clock, etc., etc., etc. P. O. Box 1035, Onset, Mass.

FOR SALE — Delfias automobile engine, 16 H. P.; 5x5 bore; opposed; never been used; price $125, including carburetor and pump. Inquire, further particulars, Box 1334, New Haven, Conn.

FOR SALE.—One 16-H.P. Rambler, $600, one 12-H. P. Ford, both good as new; will send on Ai condition. Address F. T. Evans, Connellsville, Pa.

TYPE D FRANKLIN, with cape top; 1905 model; has been run about 2,000 miles. W. D. Wood, P. O. Box 1403, Providence, R. I.

FRANKLIN, 1904 touring car, $750; perfect condition. A. W. Granger, Grand Hotel, Cincinnati, Ohio.

WINTON touring car, 1904; in perfect condition; real bargain; $750. A. W. Granger, Grand Hotel, Cincinnati, Ohio.

JACKSON cars, two-cylinder, 20 H. P., $1,250; four cylinder, 40 H. P., $2,500. The Jackson Agency, 143-153 West 39th St. 'Phone 1716 Madison Sq., New York City.

THE AUTOMOBILE BROKERAGE COMPANY

wishes to announce that it has for sale, with immediate delivery, several cars in excellent condition, with side entrance or Limousine bodies, at very reasonable prices. If you purchase elsewhere without seeing these cars first, you will be the loser thereby. 140 West 42d St., New York. Telephone 5210 Bryant.

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TWO-CYLINDER vertical, 25½ x 25½, Harrington 1904 runabout, Swartz wheels, newly painted and looks and runs like new; price $200; a genuine bargain; also large, side-entrance touring car; two-cylinder opposed motor, 10 in. by 5½ in. bore and stroke; 16-18 H. P.; not run over 500 miles; price $600 if sold at once; worth at least $1,000; these cars will be held for first answer. Box 106, Reading, Pa.

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Broadway Auto Exchange

513 Seventh Avenue
NEW YORK CITY

1905 POPE-TOLEDO in perfect condition; must sell at once; $1,800. J. F., 164 West 46th St., New York City.

1905 MAXWELL, touring car, $950; good condition. J. F., 164 West 46th St., New York City.

18-24 DECAUVILLE in perfect condition; cost $7,500; will sell for less than half to first applicant. H. H. B., Suite 501, 302 Broadway, New York City.

FOR SALE.—Ford, with tonneau; fine condition; a bargain. C. L. Cook, Delaware, Ohio.

FRANKLIN runabout for sale; 1905 model; price $750. Address Franklin, Box 16, care of Motor.

FOR SALE—A 1905 Franklin; best of condition; extra tires and liver; Jones speedometer; will sell for $500 cash. Address A. K., Box 13, care of Motor.

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Under this heading are advertised, at the rate of five cents a word, all kinds of motor supplies, parts and accessories. Motor is more widely read by car owners than any other motoring paper, and is therefore the best medium to which to advertise motor car supplies.

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FOR SALE—Two Swinehart tires almost new, 35½ x 30, $20 each; one new Splitdorf dash coil; one new glass front, large canopy top, $65. George Auto Co., George, Iowa.

SHEET METAL SUPPLIES. Specialties. Fenders Manufacturing Works, Buffalo, N. Y.

STORAGE and repairing of all descriptions; best equipped station in Eastern New York. Ulster Auto Garage, E. E. Dobson, proprietor; 22 West Union St., corner of Main, Kingston, N. Y.

W. M. SHARPE.

VULCANIZING; all makes of tires and rubber goods repaired; large stock renovated; old tires bought. 128 West Broadway, New York City.

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WRITE TODAY.
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Under this heading notices of storage, repairing, electric charging, etc., are inserted from garages at the rate of five cents a word. A "Motor Messenger" in this column will bring your garage to the attention of more motor-car owners than any other publication.

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AUTOMOBILE AND MACHINE CO., Inc.,
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AT SEVENTH AVE. DRIVE.
'Phone 4844-4845 Morningside NEW YORK.

THE SPRINGFIELD AUTOMOBILE CO., of Springfield, Mass., has just opened a new garage, which is as large and as well equipped as any in New England. It is fireproof, open all day and night. The prices are moderate, and the workmen employed are experts in their line. They are the agents for all the leading cars, and carry in stock at all times a full line of auto supplies and accessories. The situation is also convenient, being in the rear of the Cooley House, opposite the north entrance to the Union Station. Upon application we will assure you of our superiority over all others. The Springfield Automobile Co., 40 Liberty St., Springfield, Mass.

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PROSPECT PARK AUTOMOBILE CO.—Largest and most modern garage and machine shop in Brooklyn. 918 and 920 Union St. 'Phone 969 Prospect.

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FOR SALE.—Established auto factory in good manufacturing and distributing center in middle West; new models completed; satisfactory reasons for selling. Address P. O. Box 1, Station O, New York.

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AMERICAN STORAGE AND WAREHOUSE COMPANY.
DEAD STORAGE ONLY.
606 West 48th Street.
'Phone 4122 38th St. New York City.

THE Central Automobile Station has just opened their new garage at 238-240 West 50th St., New York. It is a three-story building on the Vanderbilt system, and will afford ample space for the storing and care of over 100 automobiles. They have just put in a complete repair shop with up-to-date tools, operated by mechanics in charge of an expert who has had seventeen years' experience building and handling gasoline engines. They also charge ignition batteries.

This particular location is exceptionally desirable to automobile enthusiasts who wish to locate in the heart of the automobile district. The Central Automobile Station, 238 West 50th St., New York City.

Instruction

Under this heading are inserted, at the rate of five cents a word, all advertisements of residence and correspondence automobile and motor boat schools, as well as notices of motoring books and other publications.

MANHATTAN AUTOMOBILE SCHOOL — Instruction by experienced teachers who are mechanical engineers with M.E. degree from Cornell University, 315-321 West 96th St., New York. 'Phone 3839 Riverside.

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AUTOMOBILE INSTRUCTION. — Only practical school of automobile instruction. Our courses fit you to become an experienced chauffeur with full knowledge of how to keep your machine in order. Thorough practical work only. Chelsea School of Automobile Instruction, 518 West 57th St., New York City (near 10th Ave.). 'Phone 3061 38th.

SCHOOL FOR CHAUFFEURS.—Ours is the original school of automobile instruction. Our unparalleled success has made many imitators. By careful, thorough individual work under personal supervision of the manager we make every student not only an expert chauffeur, but a thoroughly competent mechanic able to make repairs on any machine and to keep it at all times in perfect order. Satisfaction guaranteed. Positions waiting. West Side Automobile Transportation School, 309 West 41st St., New York, N. Y.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERING, 146 West 56th St., New York City.—A high-grade school of instruction for chauffeurs and automobile owners. Day and evening classes. Now enrolling students. Write, call or 'phone for particulars. Telephone 4314 Columbus.

Miscellaneous Announcements

Under this heading we are prepared to print "Motor Messengers" for other lines of trade advertisers who have a real message to deliver to motor car and motor boat owners and users. The charge is only fifty cents a word.

FOR SALE OR TO LET

AT ORMOND, FLA.

A very desirable winter home, with adjoining grove of orange and grape-fruit trees. The property consists of two hundred feet frontage on the ocean (known as "five miles three minutes' walk of the Hotel Ormond), and is seven hundred feet deep.

House is large, splendidly-built and newly decorated. Has six bedrooms and bath on second floor, spacious hallway; living-room, 27 x 36 feet, with open fireplace; dining-room and den on first floor. The basement has kitchen 28 x 36 feet, laundry, two sleeping-rooms and bathroom. Third floor has been used as an open attic, has high ceiling, is well lighted and ventilated, and could be partitioned off into rooms, if desired. House is heated with furnace, has veranda on three sides (12 x 125 feet), and is in perfect order.

Large stable with four box stalls, large carriage or automobile room and room for coachman.

A boathouse, 24 x 50 feet, making room for two large boats. Water from driven well supplies all buildings. Finest live oaks in Florida. The buildings on the property could not be duplicated for twenty thousand dollars, the land is actually worth six thousand and is increasing in value rapidly. The whole property is offered for sale at fifteen thousand dollars, or will be rented furnished.

Apply

GEORGE B. B. LAMB

49 Wall Street - - New York

REWARD offered to anyone locating a Type 7 Searchmont touring car; factory number, 181; green body, dark brown running gear. Address Stolen, care of Motor.

Help Wanted

Since all the best chauffeurs are regular readers of Motor, a "Motor Messenger" at five cents a word is the surest means of obtaining a satisfactory chauffeur.

THE first man from each garage in the United States who answers this ad. will learn particulars as to how he can increase his income by just keeping his eyes open. Send stamp. D. K., care of Motor.

SALESMAN wanted to sell something to owners who intend selling their cars; sure sale, big commission; good chance to make something on the side; send stamp for reply. Address A. S. W., room 20, New York American Building, Columbus Circle, New York.

THE CHAUFFEURS' MUTUAL BENEFIT SOCIETY OF AMERICA has just been formed; advantageous to chauffeurs and mechanics only; full information upon request; very important. C. M. B., Box 12, care of Motor.

WANTED.—Salesman who can actually sell goods at all times of the year. If you are a high-grade man, receiving a high-grade salary, write us. We have territory for two of the best salesmen in the country to market our popular, well-known automobile. Applications of cheap men will be put in the waste basket. The right man will get all that he is worth. In writing, state fully past experience, salary received, and give references. Address Olds Motor Works, Lansing, Mich.

LARGE manufacturing plant wants men to fit castings. Factory, care of Motor.

WANTED.—A chauffeur; will pay $100 and expenses; state experience and references. H. G. White, Livingston Manor, N. Y.

GENTLEMAN residing in the country wishes a man to run his car and take care of two horses; also to be a useful man about the house. Thirty-five miles from New York. Address A. C. C., Box 11, care of Motor.

WANTED.—A man to act as chauffeur and valet, with pay $60 and expenses to right man. Address Comfortable, care of Motor.

ON demande un chauffeur français pour l'automobile Léon Bolée. Responder en français. Ecrire A. O. Bolée 14, bureau du journal.

IF chauffeurs want insurance, and they all ought to have it for the sake of their families and those dependent upon them, let them give us one of the agents of one of the smaller companies who do not rob them of their earnings, but give them safe and sure insurance. Apply to the Security Mutual Life Insurance Company, 41 Park Row, New York.

Situations Wanted

Chauffeurs desiring positions can do no better than to let the fact be known by a "Motor Messenger" in this column at the rate of five cents a word.

CHAUFFEUR.—Licensed, experienced, wants a position; will take $60 during the winter; German. H. V., 549 West 46th St., New York City.

CHAUFFEUR.—Licensed, experienced; strictly temperate; best references; White Steamer preferred; can keep car in good condition. James Donnelly, 339 West 38th St.

YOUNG man, 21, would like to be engaged as chauffeur by private party or firm; can drive any make of car; has both shop and road experience. H. Clouse, 117 East 90th St., New York City.

GRADUATE chauffeur; city; at years old; three 3rd months' garage experience; wants to find position with good house, where he can prove his worth and gain experience either as mechanician or driver. Chas. McBurney, 2172 Third Ave., New York City.

CHAUFFEUR. — Experienced in every branch of the work, wants a position to run a gasoline car; lots of experience; best of references. H. A. W., Box 6, care of Motor.

YOUNG man, American, 30 years of age, would like a position as chauffeur with private family; can operate and care for car; salary from $20 to $150 per month, according to car; At references. C. I. Teague, 5 Pearson Road, W. Somerville, Mass.

YOUNG American, 26, can run C. G. V., De Dietrich, Peerless and others, wants position as chauffeur; $25 per week; careful driver and good mechanic; unserved. E. A. S., 239 West 45th St., New York City. 'Phone 1679-J 38th St.

YOUNG American, 24, wants a position on Packard or Mercedes; three years' experience; good references as to character and mechanical ability. A. H. Thomas, 2280 Eighth Ave., New York City.

YOUNG Swedish man, expert on gasoline cars, wishes a position for winter at moderate salary anywhere. D. Zachrisson, 232 West 14th St., New York.

YOUNG man, 24 years of age, graduate of auto school, will take position on gasoline or electric car at $15 a week; city or country. A. Macauley, 942 Sixth Ave., New York City.

YOUNG colored man, perfectly temperate habits, desires a position in New York; four months' experience on touring car; will come for $20 to start. L. E. M. Morris, 219 West 35th St., New York City.

YOUNG man with good references and excellent character and habits desires position in city or abroad. F. D. Stebbins, 195 Freeport St., Dorchester, Mass.

CHAUFFEUR. — Machinist, 2 years' experience; can give first-class references. G. Dehlen, 247 Avenue A, New York City.

YOUNG New Englander, graduate auto school; can run Knox, Cameron, Stevens-Duryea and others; good references. F. Hinckley, 363 Quincy St., Dorchester, Mass.

AMERICAN, with two years' experience on all gasoline cars, would like to look up for position during the winter, or for the year; has been getting $100 a month, but would come for less. John Kehoe, 501 East 115th St., New York City.

HAVE worked on Wayne, Ford, Autocar, Corbin and others; four years' experience; will come for moderate salary during the winter; will go anywhere; specialty in bearing and babits. Address Redner Ellison, 316 West 124th St., New York City.

AM out of a position on account of my employer selling his car. Received $100 during the summer months. Will come for much less during the winter. A. P., care of Motor.

NATURAL-BORN mechanic wants job as driver and repairman; understands all branches of a motor car; thoroughly experienced; speaks German and English; strictly a temperance gentleman; wages $80 and expenses. Robert L. Kowalski, Box 160, New Rochford, N. D.

CHAUFFEUR and machinist wishes position in private family. Experienced with gasoline cars. References from last employer as to character and ability. Alex. Nansen, 219 East 52d St., New York City.

Cars for Rent

Under this heading advertisements of motor cars and motor boats for hire are inserted at the rate of five cents a word. Every motorist having a car for rent should keep a "Motor Messenger" running in this column. Motor is the only motoring paper published that has any large circulation among that portion of the general public that does not own automobiles.

BOUTON MOTOR COMPANY.

AUTOMOBILE rental service; four-cylinder touring cars exclusively; garage and salesrooms, M. D. Bouton, president; Frederick J. Fanner, treasurer; James H. Scott, superintendent. 'Phone 2052 38th St. Address 110 West 42d St., New York City.

TOURING CAR FOR RENT.—Large private tour by the hour, day or trip. James L. Magee, 1405 Broadway. Times Square, New York. 'Phone 1724 38th St.

AUTOS FOR RENT.—Day, hour or trip. M. J. Vesie, 154 West 43d St., New York, or 'Phone 6782 38th St.

FOR RENT.—Fine new Jackson cars. The Jackson Agency, 143 West 29th St., New York.

THE swellest autos to hire in New York are the new 1906 Thomas Flyer touring cars. Private tours anywhere. I cater to the select trade of New York. F. Lauterbach, 1488 Broadway. 'Phone 2668 38th St., New York City.

Second-Hand Cars Wanted

Under this heading wants of second-hand cars for cash or exchange are inserted at the rate of fifty cents a word. Since Motor is read by all dealers in second-hand cars as well as by more private car owners than any other motoring paper, a "Motor Messenger" in this column is more certain to obtain for you just the car you want than any other kind of advertising.

WANTED.—Second-hand buckboard or light gasoline car. W. J. Bartholomew, Gothenburg, Neb.

A M partial to a 1905 White Steamer, side entrance, four or five seating capacity; 20 to 30 H. P. F. O. Box M., Houston, Tex.

WANTED.—A good second-hand gasoline car; state make, condition and price; not over $1,000. H. G. White, Livingston Manor, N. Y.

WANTED.—A Franklin runabout, 1903, 1904 or 1905; 4 or 6 cylinder, 24 H.P., 106-inch motor cycle; spot cash. W. H. Newton & Son, Cortland, N. Y.

WANTED.—*One* 8- or 9-inch Rushmore searchlight with generator and 5-gallon tank; also one Prest-O-Lite gas tank; also one warm top, the above to fit on 1904 Franklin. A. B. Snyder, M. D., Dalton, N. Y.

WE desire to purchase three slightly used trucks suitable for piano delivery. Address Kalkist Music Co., Ltd., Montreal, Can.

WANTED.—A late model Locomobile; will pay $700 for one in good condition. Is there any ground New York? Address A. B. C., care of Motor.

WANTED.—A 1905 Franklin runabout in good condition; will pay $200 cash for same upon quick delivery; must be in neighborhood of New York City. Address F. C. K., care of Motor.

For Exchange

A new Department sure to produce results. Every motorist has surplus accessories. Exchange them for something useful. Five cents a word.

WANTED.—A reliable automobile in exchange for a valuable mining patent. No junk wanted. Describe car fully in reply. Box 281, Holyoke, Mass.

AUTO wanted in exchange for 500 acres of timber land in Scott County, Tenn.; clear title; no incumbrances. Address Box 531, St. Augar, Iowa.

WANTED.—Steam runabout or Orient buckboard in exchange for motor cycle; give complete description in first letter. Dr. L. M. Voeller, Orleans, Neb.

HAVE a fine collection of stamps worth $150; will exchange for a runabout, and will give difference in cash. Address Collector, Box 27, care of Motor.

WHAT am I offered for an electric motor; 8 H. P.; 250 pounds? Address Electric, Box 37, care of Motor.

Hotels

As hundreds of motorists are readers of Motor, Hotels that cater to such people can do no better than insert a notice in this column at five cents per word.

HOTEL GRAMATAN, Lawrence Park, Bronxville, N. Y.—Opened June 1 and will remain open all the year. Most palatial hotel near New York; 15 miles from Grand Central Station; golf, tennis, riding, driving, etc.; refined, quiet, exclusive; capacity, 400; fine orchestra; long-distance telephone in every room; booklet. J. J. Lannin Co., proprietors; also proprietors Garden City Hotel, Long Island.

(*Continued on page 126.*)

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MOTOR STATION DIRECTORY

New York City

AUTOMOBILE ARCADE, 50th St. and Broadway.
AUTOMOBILE EXCHANGE & STORAGE CO., 132-138 West 58th St.
A. G. SPALDING & BROS., 29-31 West 42d St.
A. T. SCHULTZ, 220 West 72d St.
AUTO TRANSPORTATION CO., 370 West 41st St.
ACME MOTOR CAR, 1810 Eighth Ave.
AUTOMOBILE BROKERAGE CO., second-hand cars, 140 West 42d St.
AUTOMOBILE RENTING & TOURING CAR CO.; Hazing & Rappleyea, props., 304 West 54th St. 'Phone 1245 Columbus.
AUTOMOBILE DEPOT, INC., 231-235 West Fortieth St. 'Phones 2175 & 2177 Thirty-eighth St.
AUTOMOBILE TOURING & TAXI CO. 'Phone 6050 Cortlandt.
A-B-C MOTORING, 83 Nassau St. 'Phone 304 Cortlandt.
AUTOMOBILE SCHOOL OF NEW YORK, Forty-ninth St. and Seventh Ave. 'Phone 2531 Columbus.
AUTO IMPORT CO., 1786 Broadway. 'Phone 4637-4638 Columbus.
AUTOMOBILE HIRE AND SALES CO., 231-233 West 49th St. 'Phone 144 38th.
A. C. CO., 60 West 37th St.
BEITLER, JESSE, Special Agent Foreign Cars, 1 West Thirty-fourth St., Century Building. 'Phone 3377-38.
BLUE RIBBON GARAGE, 112-114 East Seventy-fifth St. 'Phone 1777.
BLACK DIAMOND AUTO CO., Lord's Court Bldg., 87 William St.
BONTON MOTOR CO., garage and salesrooms, 111 West 41st St.
BRADLEY JOHNSON AUTOMOBILE CO., 1200 East 84th St. 'Phone 1813 38th.
BROADWAY AUTO EXCHANGE, 137 West 48th St. Second-hand automobiles only. 'Phone 6361-6362 38th St.
CADILLAC COMPANY, 1731 Broadway. 'Phone 3321 Columbus.
CENTRAL AUTO STATION, 228 West 50th St.
COLE & WOOP, Automobile Aluminum Bodies, 48-50 West 67th St. 'Phone 715 Columbus.
CHELSEA AUTO STORAGE CO., 516-520 West 37th St. 'Phone 2454 38th St.
CHELSEA SCHOOL OF AUTOMOBILE INSTRUCTION, 518 West 37th St. 'Phone 2454 38th St.
C. A. DUERR & CO., Inc., Broadway and 58th St. 'Phone 4130 Columbus.
CENTRAL TIRE REPAIR CO., 238-240 West 50th St. 'Phone 2623 R. Columbus.
CAMERON CAR AGENCY, 7 West 60th St. 'Phone 4242 Columbus.
COMMISSION AUTOMOBILE CO., 742 Seventh Ave. 'Phone 3252 Columbus.
D. J. MARTYN'S AUTO REPAIR STATION, 52 East 128th St. 'Phone 2141 J. Harlem.
DEWITT AUTOMOBILE CO., 250 West 80th St.
EMPIRE AUTO-CAR CO., 266-268 West 125th St. 'Phone 2882 Morningside.
EXCELSIOR AUTOMOBILE SCHOOL, 257 West Thirty-third St. 'Phone 3860 38th.
F. B. STEARNS & CO., N. Y. American Bldg., 59th St. Broadway.
F. A. BAKER & CO., Indian Motor Cycle Station, 20 Warren St. 'Phone 3442 Cortlandt.
GUS LIND & CO., 231-235 East 47th St. 'Phone 2827 38th.
HARLEM AUTOMOBILE CO., 159-165 West 127th St. 'Phone 3980-81 Morningside.
HARROLD'S MOTOR CAR CO., Sole agent for Pierce Arrow cars, Broadway, 58th and 59th Sts. 'Phone 5015 Columbus.
HOFFMAN & SATTLER, Auto Station, 1918 Jerome Ave. (near 177th St.). 'Phone 233 Tremont.
HEWITT MOTOR CO., 8-10 West Thirty-first St. (near Fifth Ave.). 'Phone 1.
IRVING AUTO STATION, 128 East 19th St. 'Phone 4081 Gramercy.
JACKSON AGENCY, 151 West 29th St.
J. C. FOLEY, Auto Supply Station, Jerome Ave. and 162d St. 'Phone 611-Melrose.
KASNER & CO., Inc., fine autos, cycles, carriages, bicycles, 1324 Church St. 'Phone 249-Cortlandt.
LUBIE'S AUTOMOBILIA, 1780 Broadway, 58th-59th Sts., Bronx. 'Phone 1277 Melrose.
MANHATTAN SQUARE GARAGE, L. H. Crafts, Prop., 231-233 East Thirty-third St. 'Phone 2657 Madison.
MANHATTAN STORAGE CO., 321-329 West 44th St. 'Phone 4790 38th St. Downtown warerooms and office, 42-44 Cortlandt St. 6464 Cortlandt.
MANUFACTURERS' MOTOR CAR CO., 54 West 49th St.
MANHATTAN AUTOMOBILE SCHOOL, 315 West 96th St.
NAJESTIC AUTOMOBILE CO., Broadway and 54th St. 'Phone 4146 Columbus.
MOLTER'S AUTOMOBILE STATION, 206 West 65th St. Automobiles for hire, repairs, supplies. Telephone 2574 J. Columbus.
MOTOR BUREAU, the National bureau for selling and buying second-hand cars, 1789 Broadway and 150 Nassau St.
MOTOR VEHICLE REPAIR & STORAGE CO., 121-123 West 42d St. 'Phones 2652 Madison. Edmond Sire, prop.
McHUGH AUTO GARAGE, 130 West 102d St. 'Phone 3648 Riverside.
MOUNT MORRIS AUTO GARAGE, 17-19 West 124th St. 'Phone 820 Harlem.
NATIONAL AUTOMOBILE CO., Room 4, 102 West 42d St.
NEW YORK BRAZING COMPANY, 329 West 127th St. 'Phone 858 Chelsea.
NEW AMSTERDAM MOTOR TRANSPORTATION CO., 152 West 65th St. 'Phone 2066 Columbus.
NEW YORK SCHOOL OF ENGINEERS, 146 West 66th St.
NEW YORK TRANSPORTATION CO., 40th St. and 8th Ave.; Garage, 259-270 East 66th St.; Branch, West Broadway and Vesey St.
PAUL & HEMING, Jerome Ave Station, Jerome Ave. and 162d St. 'Phone 1569-Melrose.
PACKARD CAR TO HIRE—F. Lauterbach, 1488 Broadway, and 231 East Thirty-third St. 'Phone 2657 Madison Square.
L. M. PICCOLET, 78 Cortlandt St.
PNEU CURE CO.; Geo. W. White, mgr., 1113 Broadway.
SIDNEY B. BOWMAN AUTOMOBILE CO., 50 and 52 West 53d St. 'Phone 490 38th St.
SMITH & MABLEY, Broadway and 56th St.
ST. NICHOLAS AUTO DEPOT, 23-25 West 66th St. 'Phone 4317-18 Columbus.
STORAGE BATTERY SUPPLY CO., 239 East Twenty-seventh St. 'Phone 1065 Madison.
THE SUNLIGHT GAS MACHINE CO., 49 Warren St. 'Phone 4045 Cortlandt.
TOURING CAR COMPANY, 318 West 59th St.
TYRRELL & MENAIR, Bronx Garage, 2861-64 Webster Ave. 'Phone 861 Tremont.
THEO. E. SCHULZ; Garage, Broadway and 110th St. 'Phone 4666-7 Riverside.
THE WINDSOR AUTOMOBILIA CO., 113 West 37th St. (formerly 109 Fifth Ave.) 'Phone 6093 and 6094 38th Street.
THE AUTO SUPPLY CO., Broadway and 52d St. 'Phone 1813 Columbus.
TIMKEN ROLLER BEARING AXLE CO., 219 West 46th St. 'Phone 2042 38th St.
TREMONT GARAGE & REPAIR STATION, Bronx agency for Buckmobile; A. H. Seadale, prop., 1925 Washington Ave. 'Phone 901 J. Tremont.
TUXEDO AUTOMOBILE STATION, 33-39 East 58th St. 'Phone 1140 Plaza.
TRAVELLERS' COMPANY, 3 Park Pl., New York City. 'Phone 6254 Cortlandt.
TOURING CARS FOR RENT.—J. L. Magee, 1495 Broadway, Times Square. 'Phone 1724 38.
TWOMBLY MOTOR CO., 56 and 58 Twelfth Ave.
TIMES SQUARE AUTOMOBILE CO., 164 West 46th St.
VICTOR AUTO STORAGE CO., 147-149 West 58th St.
WAYNE, KRATZER & CO., 1172 Fifth Ave. (near 98th St.). 'Phone 2971 18th St.
WEST SIDE AUTOMOBILE TRANSPORTATION SCHOOL, 318-320 West 57th St. 'Phone 1748 38th St.
WEST END AUTOMOBILE PALACE, 202-210 West 80th Street.
W. J. DUANE & CO., 1771 Broadway.
WM. HIGGINS, Jr., hand-printing, 120 West Twenty-fifth St. 'Phone 3179 Madison Square.

Albany, N. Y.

AUTO STORAGE AND TRADING CO., 97 Central Ave.

Atlantic City, N. J.

CURRIE AUTOMOBILE CO., 12 and 14 South North Carolina Ave.
WM. M. HASLETT & CO., 24 Mansion Ave.

Aurora, Ill.

FRANK ANDERSON, 113 Main St.

Bath, N. Y.

CHARLES A. ELLIS.

Bay City, Mich.

F. H. FENNER.

Bethlehem, Pa.

NOVELTY AUTOMOBILE WORKS, 118 S. Main St.

Binghamton, N. Y.

STERLING MOTOR CAR CO.

Boston, Mass.

AUTOMOBILE SCHOOL OF NEW ENGLAND, 56 Columbus Ave. 'Phone 2864 J Oxford.
NATIONAL AUTOMOBILIA MOTOR CARS, 41 Columbus Ave.

Brantford, Conn.

JOHN C. BARNES.

Brooklyn, N. Y.

ACME MOTOR CAR CO., 1 and 9 Ocean Parkway (near Park Circle). 'Phone 1454 Flatbush.
ACME MOTOR CO., 701 Quincy St. 'Phone 38 Bushwick.
A. G. SOUTHWORTH, 542 Flatbush Ave. and 12 Clinton St.
BARNEY AUTOMOBILE GARAGE, W. Barber, mgr., 48 Schermerhorn St. 'Phone 2484 Main.
BRANCH GARAGE, Ocean Parkway, cor. Sherman St. 'Phone 1806 Flatbush.
BROOKLYN AGENCY FOR PIERCE ARROW AND OLDSMOBILE, 1326 Bedford Ave. 'Phone 4601 Prospect.
BROOKLYN AGENCY KNOX AUTOMOBILE. Arthur R. Townsend, 1148 Bedford Ave. 'Phone 2420 Bedford.
BROOKLYN AUTOMOBILE CO., 12, 14, 16, 18, 20 New York Ave., and 1817, 1819, 1821, 1823 and 1825 Herkimer St. 'Phones 3300 and 3301 Bedford.
CAMERON AUTO CO., Rockliff, mgr., 446 Hudson Ave. (near De Kalb). 'Phone 1569 Main.
COFFIN MOTOR CAR CO., 701 Quincy St.
CURTIS AUTO CO., 449 Madison St. 'Phone 3378 Bedford.
GAILLORD'S AUTO REPAIR STATION, 205 Havemeyer St. 'Phone 1844 Main.
GRANT SQUARE GARAGE, 1378-82 Bedford Ave. 'Phone 1493 Prospect.
GEO. HYLTON, Tire Repair Station, 112a5 Bedford Avenue.
HICKS AUTOMOBILE CO., 1384 Bedford Ave. 'Phone 1493 Prospect.
H. B. SANDS' GARAGE, 623 Bergen St. 'Phone 113 Prospect.
INDIAN MOTOR CYCLE STATION, F. A. Baker & Co., 1326 Bedford Ave. 'Phone 4601 Prospect.
J. M. MEARS' AUTO GARAGE, 7 and 9 Ocean Parkway (near Park Circle). 'Phone 1454 Flatbush.
LEWIS AUTOMOBILE CO., 482-88 Hancock St. 'Phone 1493 Prospect.
MONROE GARAGE, 205 Monroe St. (near Bedford Ave.). 'Phone 4444 Bedford.
OUTING AUTOMOBILE CO., Flatbush and Ocean Ave. 'Phone 1454 Flatbush.
ORMOND AUTOMOBILE CO., Jefferson Ave. and Ormond Place. 'Phone 1454 Flatbush.
PASTRE'S AUTOMOBILE GARAGE, 519 Sixth Ave., cor. Twenty-fifth St. 'Phone 1 Sunset.
PROSPECT PARK AUTOMOBILE CO., 918-920 Union St. 'Phone 1493 Prospect.
PROSPECT PARK STORAGE CO., C. L. King, Prospect Park West and Vesey St. 'Phone 566 Prospect.
RENO & LOZIER MOTOR CAR AGENCIES, Hicks Automobile Co., 1354 Bedford Ave. 'Phone 3414 Prospect.
SCHAAF GARAGE, Fulton and Cumberland Sts. 'Phone 1577 J. Prospect.
THE E. S. REMSEN MFG. CO.; Garage, 764-766 Bedford Ave. 'Phone 2846 Williamsburg. Offices, 740-750 Grand St.
WILLIAMSBURG AUTOMOBILE & STORAGE CO., 159 Clymer St. 'Phone connections.

Buffalo, N. Y.

BUFFALO MOTOR CAR CO., 432 Pearl St., Buffalo, N. Y.
NORTHERN GARAGE, 77 Virginia Pl.

Canton, Ohio

T. S. CULP.

Charleston, S. C.

ARMY CYCLE MFG. CO., 89 Broad St.

Chicago, Ill.

ASHLAND GARAGE.
FRANK P. ELLSLEY, 1390 Michigan Ave.
HYDE PARK GARAGE, 4454-56 Lake Ave.
COMMISSION AUTOMOBILE CO., 1602 Michigan Ave., corner 16th St. 'Phone 1373 South.
AUTOMOBILE SCHOOLS OF AMERICA, 1602 Michigan Ave., corner 16th St. 'Phone 1371 South.

Charlotte, N. C.

OSMOND L. BARRINGER CO., Motor Car Dealers, 20-22 W. Trade. 'Phone 1 Main.

Cleveland Ohio

W. E. BRUSSE, Browning Bldg.

Columbus, O.

THE OSCAR LEAR AUTOMOBILE CO., 4th and Gay Sts.

Cuba

HAVANA GARAGE CO., Zulueta 28, Habana.

Denver, Colo.

COLORADO MOTOR CARRIAGE CO., 1432-38 Court Place.
DENVER AUTO CO., 23 West St.

Easton, Pa.

EASTON AUTOMOBILE CO., 41 Delaware St.
H. J. HAUSER & CO., 1, 3, 5 and 7 Centre Sq.
WHITE SEWING MACHINE CO., Auto Department.

Elizabeth, N. J.

ELIZABETH AUTOMOBILE CO., 14 Westfield Ave.

Fonda City, N. Y.

AUGUST PORRIER.

Greenwich, Conn.

GREENWICH AUTOMOBILE BLUE BOOK STATION, Greenwich Ave.

Hartford, Conn.

THE PALACE AUTOMOBILE STATION CO., 190 Trumbull St. and 37 Church St.

Highlands, N. J.

KINSEY & DOBBINS, Highlands, Navesink, N. J. 'Phone East View Hotel.

Hoboken, N. J.

V. F. MEYER, 200 Washington St.
R. FULCHER AUTO EXCHANGE, 14 Park St. John Nelson, Prop.

Huntsville, Ala.

THE SPRING CITY AUTO SUPPLY CO.

Indianapolis, Ind.

FISHER AUTO CO., 24 N. Illinois St.

Ithaca, N. Y.

F. A. McCLUNE, 206 S. Cayuga St.

Jackson, Mich.

CRESCENT AUTOMOBILE CO., G. E. Blakeslee, Mgr., 2561 Boulevard. 'Phone 13-L Bergen, Jersey City. ALLEN MOTOR CAR CO., Monument Square Sta. (Cell City Hall). 'Phone 4181 Jersey City.
CLAIRMONT AUTOMOBILE CO., J. H. Livingston, Mgr., 2593 Boulevard. 'Phone 232-L Bergen, Jersey City.

Joliet, Ill.

JOLIET AUTOMOBILE & GARAGE, 100 Case St.

Lenox, Mass.

T. S. MORSE, Housatonic St.

Lincoln, Neb.

THE WITTMANN COMPANY, 205-215 South 11th St.

Lockport, N. Y.

DUSSAULT AUTO WORKS, 63 Buffalo St.

Los Angeles, Cal.

AUTO MACHINE & CARRIAGE CO., 651 San Pedro St.
A. C. STEWART, 632 Lucas Ave.
W. K. COWAN, 820-834 S. Broadway.

Marion, Mass.

B. D. TRIPP.

Mobile, Ala.

A. L. GOULD.

Morristown, N. J.

VICTOR A. WISS, 22 South St.

Mount Vernon, N. Y.

MOUNT VERNON AUTOMOBILE CO., Prospect and Third Sts. 'Phone 1230.
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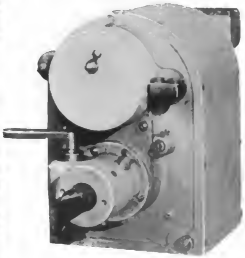
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The New Model 1906

Rainier

30-35 H. P.

What is the automobile buyer going to do when he is strenuously told that each and every one of the 1906 cars is THE BEST CAR IN THE WORLD?

He is going to do a little investigating.

He is not going to be attracted nor distracted by the whirlwind of words with which one car after another comes before the public on paper.

When he gets down to business, he will find the RAINIER in the front rank of cars that have won renown and made fast friends by actual achievement. He will find that in every inch of metal and wood, in every working part, in every line, the Rainier as it will take the road in 1906 is the very embodiment of strength, compactness, lightness and beauty—now more than ever before "The Pullman of Automobiles."

We want good Rainier agents in all unassigned territory. We can give them a car to sell that WILL sell, and that will make a new salesman of every purchaser. We stand back of the Rainier with the broadest and most liberal guarantee ever given.

Correspondence invited.



Engine.	30-35 H. P., 4 cylinders, water cooled.	**Tires.**	Continental 34 x 4.
Ignition.	Sims-Bosch Magneto—make and break spark.	**Valves.**	Mechanically operated, inlet and exhaust interchangeable.
Transmission.	Sliding train. 3 speeds forward and one reverse.	**Carburetter.**	Float feed, requiring no adjustment.
Rear Axle.	Bevel gear drive, clutch driven hub. Ball bearings.	**Brakes.**	Two internal expansion, dust protected, operating on rear hubs, through emergency lever, holding either forward or backward. Foot brake operates on propeller shaft. Both brakes bronze against steel.
Front Axle.	I Beam section. Ball bearings.		
Frame.	Cold rolled pressed steel, aluminum under bonnet covering entire engine and transmission.	**Body.**	Full aluminum, double side entrance.
Wheel Base.	104 inches.	**Equipment.**	Two head lights, 2 side lights, 1 rear light, 1 horn.
Wheels.	Imperial whalebone, grade A 2nd growth hickory.		

Price, $4,000

The 22-28 H.P. will be continued as heretofore, without any changes.

4-cylinder—98 inch wheel base—La Coste coil. French battery. Continental tires. Aluminum side door body.

Price, $3,500

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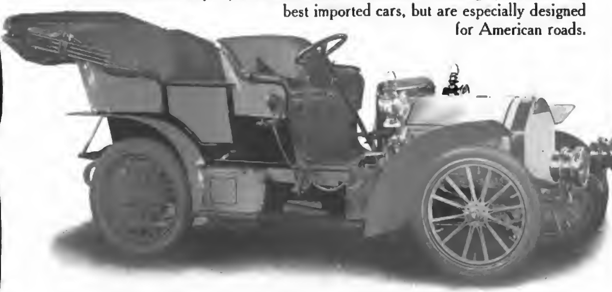
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Locomobiles are fully equal in mechanical details and running qualities to the best imported cars, but are especially designed for American roads.



Specifications of 1906 Models

Type "E" Locomobile 15-20 H. P.

PRICE $[illegible], ready for touring.
EQUIPMENT 5 brass lamps, horn, tire carrier, set of tools, extra parts, jack, lock box for tools and lubricants.
BODY Double side entrance seating 5; fitted with top irons; color and striping optional, top and luggage carrier extra.
MOTOR 4 cylinder, [illegible] bore, [illegible] stroke.
LUBRICATOR Large mechanical lubricator.
CARBURETER Automatic, with balanced throttle valve.
GOVERNOR Centrifugal type, prompt and positive in action.
IGNITION Make-and-break with iridium contacts.
MAGNETO Low tension, our own design and manufacture.
ALUMINUM PAN Placed underneath the machinery.
CLUTCH Cone type with ample surface.
TRANSMISSION 3 forward speeds and reverse.
DRIVE Double side chains.
UNIVERSAL JOINT Double universal joint between clutch and transmission.
RUNNING BRAKE Double acting type, large and powerful, metal to metal surfaces.
EMERGENCY BRAKES Internal expansion type, large and powerful, metal to metal surfaces.
COMBINED BRAKE AND SPROCKET DRUM Bolted to each rear wheel.
AXLES "I" section hand welded axles.
TIRES [illegible] on all four wheels.
WHEEL BASE [illegible].
WEIGHT About 2,[illegible] pounds.

Type "H" Locomobile 30-35 H. P.

PRICE $[illegible], ready for touring.
EQUIPMENT 5 brass lamps, horn, tire carrier, set of tools, extra parts, jack, lock box for tools and lubricants.
BODY Double side entrance seating 5; fitted with top irons; color and striping optional; top and luggage carrier extra.
MOTOR 4-cylinder, [illegible] bore, [illegible] stroke.
LUBRICATOR Large mechanical lubricator.
CARBURETER Automatic, with balanced throttle valve.
GOVERNOR Centrifugal type, prompt and positive in action.
IGNITION Make-and-break with iridium contacts.
MAGNETO Low tension, our own design and manufacture.
ALUMINUM PAN Is placed underneath the machinery.
CLUTCH Cone type with ample surface.
TRANSMISSION 3 forward speeds and reverse.
DRIVE Double side chains.
UNIVERSAL JOINT Double universal joint between clutch and transmission.
RUNNING BRAKE Double acting type, large and powerful, metal to metal surfaces.
EMERGENCY BRAKES Internal expansion type, large and powerful, metal to metal surfaces.
COMBINED BRAKE AND SPROCKET DRUM Bolted to each rear wheel.
AXLES "I" section hand-welded axles.
TIRES 34" x [illegible].
WHEEL BASE [illegible].
WEIGHT About 2,[illegible]00 pounds.

The Locomobile Company of America, Bridgeport, Conn.

NEW YORK, 76th Street and Broadway,
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LEATHER BAG
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NUTRIA CAP with ear flaps.
This cap is made in a variety of furs

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in raccoon skin of the finest quality



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PIERCE



This is a rather good picture of the Great Arrow Victoria Tonneau, 40-45 H. P., with semi-enclosed top, made by the George N. Pierce Company. Price, $5,000. Semi-enclosed top, extra, $350. Cape top, extra, $150.

FIVE thousand dollars invested in an Arrow car brings a better return for the money than twice that amount invested in a foreign car. The prestige of foreign cars, aside of course from admitted good car construction, is due to a certain sense of pride and satisfaction in owning an imported and expensive car. Every American gentleman who considers his investment in a touring car on the basis of the best return for the money will, on investigation, be convinced that the Arrow will give him more for its cost than any foreign car made. The Arrow is the highest-priced American car made. But as the American motorist learns to discriminate, he will consider the additional price a good investment when it saves both expense and worry. The chief expense of a motor car is the cost of running it. The record of the Great Arrow, in the Glidden Trophy Tour, of one thousand miles without a single adjustment, is not a phenomenal performance for the Arrow. It is something which any American gentleman, not an expert chauffeur, can duplicate with a Great Arrow car.

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REO

$675 **Reo 1906 Four-Seated Runabout**

The extra seat carries two people facing forward, and when not in use, is folded down snugly out of the way. 8 h. p., 1000 pounds, 25 miles per hour.

5 Prizes Out of 7

In the New York Motor Club's Great Six-Day Economy Test

The Reo 8 Horse-Power Runabout (shown above) carried 4 passengers 682 miles for $3.81½ per passenger

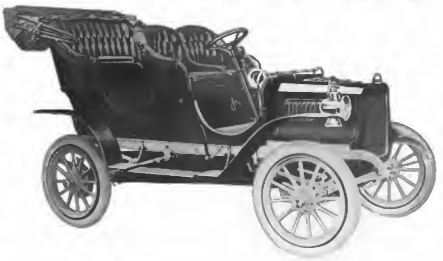
By this feat this car won two medals. The gold medal for all cars up to $1500 in price; and the *MacMurty medal* for least ignition trouble; having none at all.

The Reo 'Bus with exactly the same horse-power as the Touring-Car shown below carried ten passengers 682 miles for $2.93 per passenger (including ferriage)

And won three prizes: *The National Trophy* for Economy per passenger; the *W. J. P. Moore Trophy* for Economy per mile, including tire charges which were only 43 cents; and the *Morgan Trophy* for the least gasolene cost per passenger, which was only $1.60 for the entire distance.

Thus 5 prizes out of 7 went to the splendid REO capacity and power.

Write for the REO Book that tells why



REO 1906 TOURING CAR. 16 h.p., 1600 pounds, 90-inch wheel base, 5 passengers, side-door detachable tonneau. Speed 35 miles per hour. $1250.

REO MOTOR CAR CO.

Sales Department

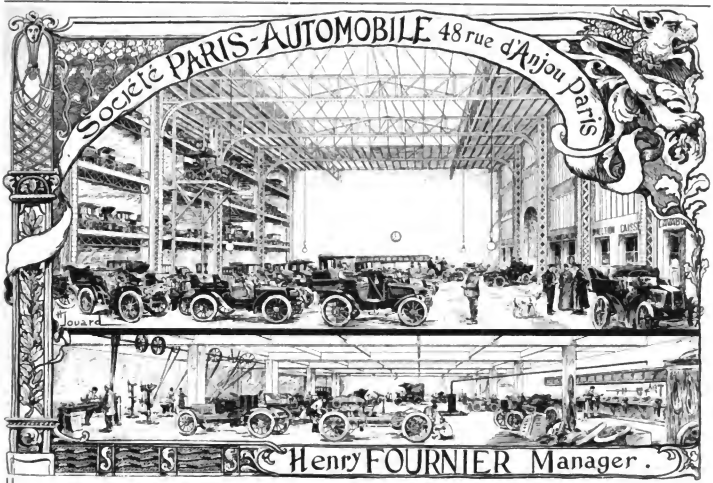
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The New Thomas

Greatly Exceeds My Most Sanguine Expectations

Experts Say It Is A Wonder



No customer is so critical or hard to please as the manufacturer, who, regardless of cost, absolutely determines to do his utmost to build the best car in the world.

But, when an ordinary Stock Touring Car, without special preparation or intention, runs sixty miles an hour on the level and climbs a 10 per cent. grade on the high speed at forty miles per hour, within an hour after it first leaves the shop, it is something that not one car in a thousand will do.

Under favorable conditions we should do sixty-five miles an hour.

I am more pleased than ever with its speed, hill climbing, quiet operations and mechanical superiority, and cordially urge disinterested Automobile experts everywhere to rigidly investigate our claims and compare our material, workmanship and design with the highest priced Cars in the world—and we will win the verdict.

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For the E. R. Thomas Motor Co., 1415 Niagara St., Buffalo, N.Y.

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1906 POPE Hartford AUTOMOBILES 1906

New Model F Pope-Hartford

20-25 H.P.—$2,500

Cannot be excelled at anywhere near the price for quietness, speed and hill-climbing qualities

MOTOR:—Four-cylinder, vertical, water-cooled engine with all gears encased, developing under brake test 28-30 H.P.

TRANSMISSION:—Of the sliding gear type, having three speeds forward and reverse.

DRIVE:—Is through a longitudinal or propellor-shaft, having universal joints at either end through a pinion and bevel gear to the rear axle.

BODY:—Is of new and graceful design, comfortably seating five people: non-removable dust-proof tonneau with double side entrance specially easy of access.

All parts easily accessible.

Pope-Hartford Model D

A two-cylinder opposed, 18 H.P., touring car, wieldy and reliable. The machine that did the 1,000 miles of the Glidden tour with only a ten-cent repair. **Price, $1,600.**

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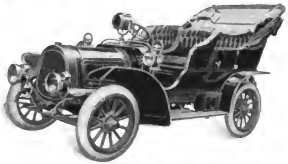
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HARTFORD, CONN.

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New York City,	**1733 Broadway**
Boston, Mass.,	**223 Columbus Ave.**
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A. L. A. M.



Model F. Price, $2,500
(With top, $125 extra)

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Wayne

An Introduction to the Wayne Cars of 1906

The appreciation accorded our cars last year warrants us in greatly increasing our capacity and in placing before the automobile trade improved types of Wayne cars. The four models we now present are the result of mature experience. They are not new and untried experiments. Each car is a distinct type of Wayne design and construction and each model has been built with a view to supplying the varied demand for high grade machines. In the Wayne cars of 1906 the automobilist will be sure to find a car suited to his needs.



Wayne Model F $3,500

MOTOR, 4 cylinder vertical, cylinders 5½ x 5 cast in pairs. Cylinders and pistons ground. Engine develops by brake test 50 H. P. Water Cooled. IGNITION, jump spark with quad coil and storage battery. TRANSMISSION, sliding gear with three speeds forward and reverse. Hess-Bright ball-bearings throughout. REAR AXLE, shaft drive floating type. FRONT AXLE, I beam drop forged, one piece, nickel steel. WHEEL BASE, 114 inches. TIRES, 34 x 4½. EQUIPMENT, includes all necessary tools of the best quality, 2 side lamps, 2 acetylene head lights with generator, tail lamp and tube horn.



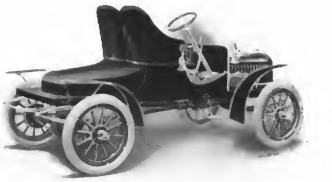
Wayne Model K $2,500

MOTOR, 4 cylinder vertical, cylinders 4½ x 5 cast in pairs and water cooled. Engine develops by brake test 35 H. P. Cylinders and pistons ground. IGNITION, same as model F. TRANSMISSION and axles same type as Model F. TIRES, 32 x 4. EQUIPMENT, same as model F.



Wayne Model C $1,250

MOTOR, double opposed of the standard Wayne type, with cylinders 5½ x 5. Engine is hung under the chassis frame and develops by brake test 20 H. P. *This is the same type of car which proved so successful last season, brought up to date and with all new improvements.* TRANSMISSION is of the planetary gear type with chain drive. CONTROL is by a single lever which engages the high speed clutch and reverse. The slow speed and brake are controlled by foot pedals. TIRES, 30 x 3½. EQUIPMENT, complete set of tools, side oil lamps, tail lamp and horn.



Wayne Model H $800

Two-passenger Runabout

MOTOR, 2 cylinder opposed under hood. Cylinders 4½ x 4 developing 14 H. P. water cooled. TRANSMISSION, planetary gears with DIRECT BEVEL GEAR DRIVE. Control the same as Model C. Wheels 28 x 3. Equipment, complete set of tools. *The strong features of this car are the extreme simplicity and accessibility of the engine and transmission. The crank case and transmission case form one casting and the entire engine can be taken apart or assembled in half an hour.*

We want agents to write us about the Wayne cars for 1906. Agency arrangements can now be made for unoccupied territory. Write while you think about it, for full particulars

WAYNE AUTOMOBILE CO., Detroit, Mich.

Member American Motor Car Manufacturers Association, Chicago

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MOTOR

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A ROAD IN HAWAII

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VOL. V. No. 3 DECEMBER, 1905



MOTORING IN HAWAII

By Elizabeth Prescott Sargent



FEW places on this earth, where the roads are fairly passable and where sights of interest draw our attention, have not been aroused from their native lethargy by the toot of the horn, the whir of wheels, and the pulsating exhaust of the engine of a motor-car. In our own country the most rural of farmers now hardly raises his eyes, bent to the earth he is tilling, to catch a glimpse of "one of them 'ere devil wagons," and the first qualification of the horse which our husbandman now buys is that he must be thoroughly "auto-broke." So it is in almost every quarter of the globe, from the passes of the Alps, which have been skilfully traversed by the horseless carriage, to alert Japan, who, eager for every product of progress, finds the motor-propelled vehicle almost a rival to her more romantic, coolie-driven jinricksha.

To one who has visited and known the Hawaiian Islands, the innovation of the motor-car seems almost a sacrilege at first thought. Made primarily for swift motion, this machine appears to dispel that semi-tropical ease of living and doing things which is innate with every one who is born in these islands, and seductively contagious to those who come to this "Paradise of the Pacific." But the introduction of the motor-car was as inevitable as the raising of the American flag over the palace of Hawaiian royalty, after we took possession of the Philippines.

The installation of Hawaii as a territory of the United States and the laying of the Pacific cable have awakened Honolulu to the most up-to-date ideas and methods, and one can hardly believe that one is over ten thousand miles from "little old New York." The lover of old Hawaiian usages notes their discontinuance with deep regret, but then this much can be said: "They can rob us of our native customs, and even bring the latest innovations to our very doors; still shall we possess the wonderful beauties of nature that make life one grand song in this earthly heaven."

There are five principal motor-car tours which can be made from Honolulu in and



GOING UP THE PALI (PRECIPICE) FROM THE TOP OF WHICH, 1,500 FEET UP, MAY BE SEEN THE OTHER SIDE OF OAHU ISLAND AND ITS 30 MILES OF RICE FIELDS

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around the Island of Oahu, upon which the capital of the territory is situated. Take, for instance, a day in mid-winter, when the dwellers in the United States are shivering in the freezing blasts of Boreas. It is just the opposite in Honolulu, with nature smiling and every tree and bush indicative of a summer which never changes.

The four shorter and more popular trips, each of which can be made in a morning's or afternoon's spin, are: First, to the Pali; second, around Diamond Head, taking in Waikiki Beach, Kapiolani Park, the racetrack, and polo field; third, to Moanalua; and, fourth, to Punchbowl and Mount Tantalus. The long excursion which takes several days is around the Island of Oahu, stopping at the Haleiwa Hotel at Waialua, half way around.

Now, we start out for our run to the Pali up through Nunanu Valley, past beautiful homes, many of which belong to the descendants of the early missionaries. The gardens about these residences are truly typical of Hawaiian life. Rows of royal, cocoanut and date palms, and hedges of brilliant hued hibiscus line the roadways leading to the houses. Vines of such varied colors that would make Joseph's coat seem a neutral tint fairly cover the mansions in gorgeous rainbow tints. Shrubs, flowers, and ferns, from every land, bloom in utter oblivion of their native soil.

Past all of the residences, further up the Pali, is wilder country, where on either side of the road are situated the small huts and gardens of the native *lei* women or makers of flower wreaths. The wearing of flower *leis* is one of the old customs which has not passed away, and every morning a large stage transports these old native women, from these garden suburbs, into the city of Honolulu, where they sit all day long on straw mats beneath the shop windows, wreathing *leis* of flowers of all colors, forms, and perfumes, and selling them to the passersby.



ROYAL PALM AVENUE, NUNANU VALLEY A LAND OF BEAUTIFUL HOMES

Next we arrive at the Pali, which in the native Hawaiian language means precipice. From this height of fifteen hundred feet, one looks out over the other side of the Island of Oahu over thirty miles of peaceful rice plantations, where, to quote Charles Warren Stoddard: "Peace, a visible peace, with winding roads in it, and patches of bright green sugar cane, and wee villages, and palm trees upon the distant shore. It is picturesque in form, delicious in color. Something to look at in awe and wonderment, and to turn from at last with a doubt as to its reality." And yet one would not think here it was one hundred and ten years ago the great King Kamehameha drove an army of thousands of Oahuans over this great precipice to their death when he came to conquer this island.

The next run is out to Waikiki Beach, which corresponds to New York's most popular suburban seashore resorts, and where every one goes for his or her daily dip in the ocean the year 'round. Here one may try the world-renowned canoe surfriding, being borne in upon a breaker from a distance of a quarter of a mile. The great waves rush over the coral barriers towards the shore and carry the canoe just in front of the curving surf.

From here our motor-car takes us to the beautiful Kapiolani

(Continued on page 98.)



COMING DOWN THE PALI ON THE WAY FROM HONOLULU AROUND THE ISLAND OF OAHU

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From Providence to Provincetown



By Mrs. A. Sherman Hitchcock

AMONG the many delightful trips which the New Englander finds in his most lovely country, there is none more alluring, or of more interest to the motor car devotee, than a journey down Cape Cod, to appreciate which must be by motor car. It was an almost ideal day when we left Providence—a party of four in our Autocar, and everything seemed to presage a most delightful trip.



NEAR YARMOUTH

Leaving the city by way of Washington Bridge and East Providence, we took the road leading to Taunton, Mass., beyond which city we journeyed to Middleboro, finding excellent roads thus far. From Middleboro to Wareham the roads are in the finest possible condition for about twelve miles; all the more noticeable because from about that distance, and on into Wareham, the road is rough and sandy, and the country not a particularly attractive one. As we near the little village of Wareham we travel over very poor roads of a peculiar soft black dirt which seems to be found only in that immediate vicinity.



THE OLD WIND MILL ON JEFFERSON'S ESTATE



A SANDY HILL NEAR PROVINCETOWN



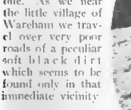
HIGHLAND LIGHT, NORTH TURO



A STRETCH OF BAD ROAD NEAR ORLEANS



OVER WHICH A MOTOR CAR HAD NEVER BEFORE TRAVELED



THE HOME OF THE LATE JOSEPH JEFFERSON

We cross the Wareham River and speed in over beautiful roads to Onset, the spiritualistic haven during mid-summer. There is a large settlement of Portuguese at the beginning of Onset proper, and at one side in a shady wood we found a band of gypsies lighting the fires with which to prepare supper. Their tanned faces, black hair and gay colored clothing made a most artistic and picturesque group. Onset is but a small place, but abounds with life during the summer season, but which is "deader" than the proverbial door nail in winter. Its one leading street lying close to the bay is lined with hotels and souvenir shops, and the spiritualists' camp-meeting grounds directly in their midst. The grove is a fine large one and is said to be filled during the camp-meetings when spiritualists come there from all parts of the country.



THE OLD TOWN HALL, PROVINCETOWN

We stopped at the Glencove Hotel for supper and had an excellent one. A garage is connected with the hotel, which is a great convenience to motorists. A most charming view is to be had from the hotel. Beautiful Onset Bay lies directly in front with its lovely islands, upon which are built fine summer homes. After a stop for supper and a little viewing of Onset, we proceeded onward, reaching Buzzard's Bay at the most glorious time of the day—sunset.

At Buzzard's Bay, which consists of a railroad station, post office, a very unpretentious hotel, one or two exceedingly small shops, and possi-



BISHOP AND CLERK LIGHT

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ble three or four unassuming houses, the real points of interest are the summer homes of the late Joseph Jefferson and ex-President Grover Cleveland, which are both located at this place, though some distance from each other, and quite different from point of view and architecture. Both are in large estates of pine groves set back some distance from the highway.

FIELDSTONE HALL. R. C. NICKERSON.



SUMMER HOME OF OF BOSTON



A TYPICAL CAPE COD ROAD

"Crows' Nest," the magnificent home of the late Joseph Jefferson, is on an eminence overlooking the bay, and stands among most attractive grounds made beautiful with shrubs and flowering plants. A very fine stable is nearby, and a tall windmill just beyond adds much to the whole picturesque effect. Adjoining the estate is the handsome home of Joseph Jefferson, Jr.

"Gray Gables," the Cleveland home, although it is large and comfortable in appearance, the house is very plain and unpretentious. It is directly at the water's edge where Mr. Cleveland keeps his boats. it seems to be situated ideally for duck-shooting and fishing, which are Mr. Cleveland's favorite pastimes.



THE HARBOR AT PROVINCETOWN

AN OLD CAPE WHALER





GOING INTO HYANNIS

The trolley has been near us, until on leaving Buzzard's Bay we see it for the last time till our return trip brings us back again, for below this place the trolleys have not as yet made their appearance. We continue on over roads which are traveled only by horse or by motor car. We shortly come from thickly wooded hills to beautiful, more open valleys, with occasionally, and rarely, a little house charmingly nestled among the trees. The roads are lined with magnificent trees gracefully arching overhead. Through this part of the country we



ROAD NEAR TAUNTON

find the finest macadamized roads.

As we near the village of Sandwich — it is said by the inhabitants to be a village—the first thing that attracts our attention is a very large signboard placed conspicuously near the highway, warning motorists against exceeding a speed limit of six miles an hour. Two codfish-catching and clam-digging constables stand sentry over the town, which seems to consist principally of a huge graveyard, which occupies the centre of the place, and a few houses scattered about with blinds tightly closed. It is evidently not really essential to be traveling



AFTER LEAVING EGYPT

speedily to raise the vigilance of these country lawmakers, but apparently all are stopped on general principles, as we were told that no motorist—however inoffensive and well-meaning—escapes. We were hailed by a hungry-looking individual, whose anxiety lest

(Continued on page 110.)



"GRAY GABLES" EX-PRESIDENT HOME OF CLEVELAND

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The Life Story of Gasoline



BY CHAS. QUINCY TURNER

THE life story of gasoline is the apex of the science of the nineteenth century, and one of its greatest triumphs.

The past century has been remarkable for continuity of efforts to control force for locomotion. The gropings of the practical mind of Watts in his efforts to make steam subservient to man came first; then came steam chained to man's victorious chariot on tracks; thereafter we saw the first efforts to compel electricity to do man's bidding; and, finally, gasoline made its entry into the field of practical propulsion.

It is not unnatural therefore that, with familiarity with its capacity, there should be curiosity to know more about it. Whence comes it, and what are its limits? It is easier to answer the first question than to prophesy the last. We are, most of us, familiar with the effects of this wonder-working force; every day experience with our motor-cars (or boats) have made us so. But that is only its threshold. We can see, even in these, its infant days, that its future will be gigantic. It can run a train of merchandise on the present railway tracks; or turn a massive drawbridge over a river; or propel a huge ship with a 5,000-motorpower engine; or drive the housewife's sewing machine. It is threatening practically to extinguish the use of coal for heating and lighting. It produces these magnificent results, too, at a cost per unit greatly less than any other equal force, and with machinery which occupies less than one-fourth the space given to any of its rivals.



THE OIL-WELL DRILL

How have these miracles been wrought? Like all the great discoveries which have revolutionized the world of applied force, gasoline is another remarkable coincidence by which one invention is made practicable by another. Such sequences are the commonplace of mechanical science, yet they are wondrously interesting. To mention only one—telegraph—the discovery of the means by which messages could be transmitted, and which made safe railroad traveling possible. So it is with gasoline. If the motor-car had been invented before oil wells had been discovered, the gasoline engine would have been absent: for up to a few years ago the supply of naphtha, which is the basis of gasoline, was restricted as to source, i. e., pine trees and coal tar, and not enough could have been obtained in a year to supply the present needs for forty-eight hours.

Of course, the natural wells of Asia Minor had been known as a source of oil supply from the earliest periods of civilization, but through all the centuries they had been barren as to naphtha. The analytical chemist had not arrived. When he came, he also saw and conquered, and America was his arena. Nature had, through endless æons, been storing up just the material requisite to crown man's mechanical ingenuity with success. Æons and æons ago she had spread over a greater portion of the continent a floor of slaty shales, through which no moisture could penetrate. Then she spread above it a carpet of friable porous sandstone, upon which grew in a moist and tropical climate, myriads of trees and tree-like ferns and mosses, which were surcharged with tars, and oils, and resins, and spirits.

In the course of ages this prolific growth dwindled, and the accumulated debris of untold centuries sank and sank, lower and lower, becoming in its turn covered with another deposit of slaty shales, impervious to liquid. The weight of this superincumbent mass of rocks, bearing down on imprisoned tree-growths buried below it, slowly compressed them, distilling from them by subterranean alchemy their component elements of oils, and resins, and tars, and spirits, and their resulting gases. There was no escape for this distillation, the relentless, impermeable, slaty shales below and above held it in a world-girdling press. In the fullness of time the whole sandstone layer, not only in America, but through the whole girdle of the globe, from Java westwards, across Europe, and from the Atlantic to the Rockies became saturated with residual products, like sponge.

Evidences of the working of this mighty, buried mill of God had percolated to the surface, here and there, practically unnoticed except as curious phenomena, sometimes even as a light floating upon waters, yet entirely unrecognized as having any commercial value, until about the year 1800, when, by reason of the fact that similar oil-exuding crevices among the peats and bitumens of Great Britain had yielded under chemical treatment a satisfactory money return, investigations began to be made in eastern Pennsylvania, which resulted in the tapping of the great oil and natural gas deposits, and the production of the raw material for making gasoline and its allied products, in quantities such as it had never entered into the human mind to conceive. Practically every eastern state north of Pennsylvania has been found to yield more or less oil of varying degrees of quality, and the area seems ever increasing. Only yesterday,

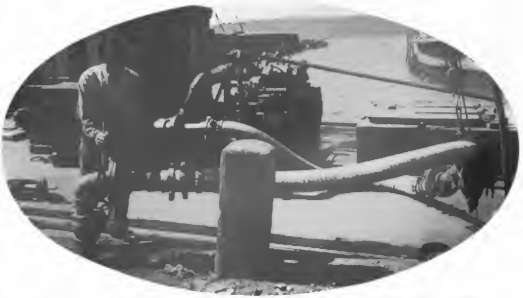


THE 'PIPE LINE' WHICH CONVEYS THE RAW PRODUCT TO THE REFINERIES

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as it were, the resources of Texas were added to the home supply, to say nothing of reported finds in the Northwest, as far up as the Mackenzie River basin, and eastward to New Brunswick and Newfoundland; whilst Java, China, Burmah, and India have been added to the possibilities of supply in the Orient. The motorist need have no fear of a famine for many centuries.

What nature supplies, however, is only the basic material. The chemist and the distiller separate the component parts into various products, including the benzines from which the gasoline of commerce is made. There are, of course, grades of gasoline, only the highest of which is suitable to the motor; lower grades being used as solvents, and for lighting and other coarser purposes.



A SHIP WITH OIL IN BULK, SHOWING DECK-PUMP, MAKING CONNECTION WITH STORAGE ON LAND

Although, as already stated, indications of the existence of crude oil sometimes come to the surface by its own inherent pressure, but it has to be drilled for to obtain it in quantities which give it commercial value. The first step, after studying natural evidences of likelihood, is to erect a derrick, an engine and a drill, and to drill out a core through the superincumbent surface soil and slaty shale, and to carry down a protecting shield pipe, until the oil-soaked sandstone stratum is reached, at a depth on the average of about 400 feet. When this has been pierced to a satisfactory depth, a fact easily determined by experts, from one to twenty, five-gallon cans of a high explosive are let down the pipe, and at the bottom are exploded, an operation technically known as "torpedoing the well." The enormous force generated in confinement liberates the adjacent soil, and there is often an eruption of liberated fluids and gases, which rise like a geyser high into the air, and run to waste. This gushing period is of long or short duration, according as the field is virgin or surrounded by other wells, but frequently it soon ceases, and thereafter a pumping "barrel," as it is called, has to be introduced to the bottom of the well, and the coarse, viscuous, dark material, which is generally called "oil," has to be lifted to the surface by pumping.



THE OLD AND THE NEW GASOLINE BARRELS

It stands to reason that the process of refining the crude oil into its various constituent products, cannot with advantage be done at each well, the next step, therefore, is the removal of the oil to a central point where it can be treated in bulk by specially constructed machinery, and scientific and chemical experts. The original method was to barrel it in ordinary wooden barrels; then in metallic barrels; next it was sent by rail in huge iron tanks, each containing many hundred gallons; but, in the end, it was found to be the most economical way to lay a pipe line from the congerie of wells at the field to some convenient center, preferably on the tide-water margin. Through this "pipe line" the crude oil is sent on its long journey by pumping. Many such pipe lines traverse hundreds of miles over the country, up hill and down dale, across rivers, occasionally on the surface of the land, but more frequently buried. They are a familiar sight to the initiated, but by the casual observer are as likely as not mistaken for water mains. They are an extremely valuable link in the chain of life of gasoline.

When the crude oil arrives at the refinery, it is stored in tanks, from which it is drawn off as required for the process of refining. It is subdivided into many by-products, such as paraffin wax, lubricating oils, solar oil for enriching gas, kerosene, and the various qualities of benzines, in which last we are more keenly interested, inasmuch as from them the motorists' gasoline is obtained.

When the crude oil has settled so that whatever water and sediment there was in it have subsided, its treatment varies with the processes favored by individual refiners. In some cases it is mixed by means of paddles on a shaft, with acid or concentrated oil of vitriol, and allowed to settle, when the acid is drawn off, and the treatment repeated with dilute caustic soda. It is then pumped into stills, into which live steam is introduced. Distillation commences at once, during which different degrees of temperature cause different percentages of gradually increasing densities to distil over. The spirit in this



THE REFINERY WHERE THE CRUDE PRODUCT IS DISTILLED: THE DAY SHIFT LEAVING WORK

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FILLING THE REGULATION UNDERGROUND GASOLINE STORAGE TANK IN A GARAGE

fractional distillation, so divided, is directed, each gravity into its proper receiver; amongst them is a grade of crude naphtha which is redistilled and filtered, so as to deprive it of disagreeable odor; and ultimately the pure gasoline of motoring commerce is evolved.

Now begin troubles of another sort, for this gasoline though an excellent servant is a bad master, and the state has enacted many regulations as to the only manner in which it shall be permitted to be distributed and stored. The government emissaries take cognizance of it before it leaves the refinery, in order to ensure that none is sent out which is inflammable when exposed to a specified heat, and every barrel, before it can leave the distillery, must bear the mark of the state inspector. The same minute supervision follows it to its destination and every garage which stores more than ten gallons must be a brick building with no sub-cellar, and the tank, into which the gasoline from the barrels is emptied, must be buried in earth at least two feet below the surface. In garages not so provided, no greater quantity than ten gallons is permitted at one time, and then only in sealed cans, the pattern of which has been approved by the Bureau of Combustibles and the Board of Fire Underwriters. All this is necessary by reason of the volatile nature of gasoline, and its otherwise uncontrolable affinity for the atmosphere, for when that combination is effected there are possibilities of danger abroad.

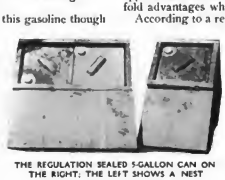
When the gasoline in its final form has, by the necessities of the case, to be transported by locomotive railroads it meets with no joyful welcome, and many further regulations, but none of them less requisite than those which were pointed out in MOTOR for June last under the caption of "How to Handle Gasoline."

But ultimately, after all these transmutations, trials, travels, and tribulations, the gasoline reaches the garage, and there it is subjected to the final care of being strained into the car's tank. Just at this point begins the final chapter in gasoline life. We have rescued this power-imp from the world cavern in which nature had imprisoned him; distilled, purified, and transmuted his vital essences; made him as innocuous and harmless, to all appearances, as water from the spring; and have finally cased him up in the motor's tank.

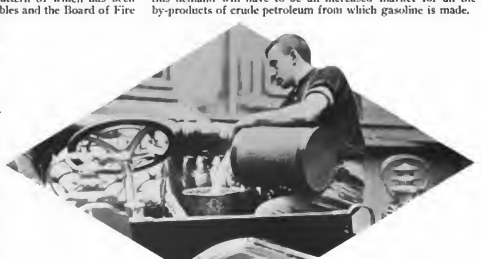
The curious will naturally wish to know by what spells or magic this innocent, docile inert fluid, gasoline, is changed in the twinkling of an eye into one of the most potent forces in the world of motion. The explanation is as simple as human breathing, and very like it, for just as the common atmosphere is drawn into the lungs, passing into the blood, renewing the whole of its vitalizing power by the introduction of the oxygen, so an infinitesimal portion of gasoline being inhaled (with a certain quantity of atmospheric air) into the lungs of a motor car, the carbureter produces an explosive gas, which passes into the cylinder, and is there ignited and exploded, producing power.

Well may one, in reviewing the life story of gasoline, marvel at the wonder of modern science, and feel justified in claiming for the motor the highest of its honors for practical application. It needs no gift of prophecy to foresee the manifold advantages which are coming in its train.

According to a report issued by the U. S. Geological Survey, the total output of crude petroleum in the United States during the year 1904 was 117,063,421 barrels, or approximately 5,000,000,000 gallons. The total value of all the petroleum marketed in the United States during the year in question was $101,170,466. The gain in actual production over that of the year previous (1903) was 16,602,084 barrels in quantity and $6,476,416 in value. The report of this Department goes on to say that all indications point to a still further increase in the production of petroleum in the United States for a number of years to come, that is to say, an increase each year over the preceding one. This increasing demand for petroleum in this, and, in fact all countries, is attributed by the department to the use of gasoline for motor cars. Along with this demand will have to be an increased market for all the by-products of crude petroleum from which gasoline is made.



THE REGULATION SEALED 5-GALLON CAN ON THE RIGHT: THE LEFT SHOWS A NEST OF TWO 5 GALLON CANS



THE LAST STAGE. FILLING THE TANK IN A CAR WHENCE THE GASOLINE PASSING THROUGH THE CARBURETER ENTERS, AND IS EXPLODED IN THE CYLINDER

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Correct Motor Raiment

By Joel Feder



From Saks & Company
OF AUSTRALIAN OPPOSUM WITH CAP TO MATCH

F all the fashions that the smart furriers are showing, those for motor-car wear are the most bewitching that can be conceived. The days are long gone by—and it is safe to prophesy that they never can return—when the winter motorist bundled up himself—or herself—in furs that made him take on the appearance of an animated doormat, or of some huge and hairy monster that had in some mysterious manner learned to walk upright instead of on all fours, which the coat would seem to indicate as the correct and natural position.

Of course each and every furrier who aspires to fashionable patronage has an especial motoring department, where garments suited to the requirements of the "sport of the twentieth century" and the exigencies of winter weather are most alluringly displayed.

The very latest and really the most attractive showing is made at a house where the garments are such that they may be used for other occasions than mere motoring. Indeed, the very best designers of to-day are striving hard to get away from such accepted models; and, apart from the delightfully comfortable lines which the latest models display, there is very little to distinguish *Miladi's* motor coat of fur from her carriage wrap of the same pelts.

Far otherwise, however, is it with masculine apparel. The masculine motor coat is a motor coat pure and simple, and does not lend itself well to other uses. Few less freakish furs are used this season by the well-dressed man, and this applies with even more force to those of the well-dressed woman. There are fewer of the very bushy, doormat kinds; and the preference is for those of medium length of hair, if not, indeed, altogether for the short-haired varieties.

Utility rather than elegance characterizes the man's surtout; and oftentimes there is a visored cap and long gauntletted gloves of the same fur. In fact, the entire motoring outfit must be of the same fur throughout, if the dictates of fashion are to be followed. There are smart-looking models in marmot, in Australian 'possum, in curly astrakhan; to say nothing of garments in sealskin and the heavier grade of Persian lamb for men, which are every whit as elegant and as costly as those which the fair feminine enthusiast dons for a motoring trip.



From Henry Siegel
COAT OF BROWN CUL AND COLONIAL

AND WHITE CARA HAT IN ERMINE



From C. G. Gunther's Sons
LONG COAT IN MOIRE ASTRACHAN WITH DOUBLE BOLERO EFFECT

All of the most modish pelts are displayed to tempt her motoring ladyship's fancy; and the shapes are all of those upon which Dame Fashion has set the seal of her most beaming approval. For the moment caracul occupies the seat of honor, and truly there is much to be said in its favor. The pelt is one that takes kindly to several shades in dyeing; and, with the vogue of the dyer's art in everything from filmy laces to substantial furs, it is not to be wondered at that the pelt which best lends itself to such manipulation should be in the very front rank of fashion.

The natural or undyed caracul, a soft creamy white, is much used for those snappy short caraços that the *Parisienne* so much admires; but for longer garments it is the dyed kind—either a soft, smoky gray, or an equally soft, smoky brown that is considered correct; while as for the black pelt, that is seen everywhere. The white caracul is delightfully used to trim up the dyed kinds; and for headgear it is bewitchingly becoming to the average girl.

One extremely smart model is in full length. The garment itself is one of those novel Russian dolmans that Gruenwald introduced early this season in both Paris and St. Petersburg—and his word is law where furry fashions are concerned. The garment is in black caracul, long and loose fitting, with a vest and sleeve borders in the white fur; and with it the most fetching motoring cap or hood that could possibly be imagined.

The dark gray Siberian squirrel is deservedly a favorite with the girl whose complexion can withstand the trying color. One clever furrier makes use of rather high velvet collarsof the Napoleonic type on long or short coats of this fur, the velvet being selected to suit the wearer—with red very much the favorite—and this is embroidered with lots of gold, so that the dull and sober gray of Quakerish hue takes on quite a lively air. This touch of becoming color right beneath the face is effective.

Long and loose coats or surtouts of Russian pony, sea lion, beaver—a recent restoration of fashionable favor—and astrakhan are displayed with muffs to match, and quaint shapes rule in those latter items. Mink is in extreme fashion—for those who can afford it; and sealskin is once more in the fashion catalogue and a favorite of votaries of fashion.



From Scandinavian Fur & Leather Co.
MARMOT COAT WITH HIGH COLLAR AND VISORED CAPE CAP

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WINTER MOTORING

WASHINGTON to BALTIMORE



BY C H CLAUDY

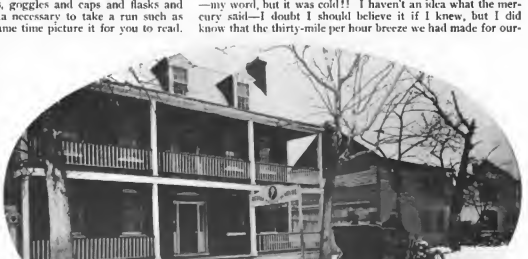
IN these days of motorcar journalism there are few motorists who have not read of the delights of winter motoring.

But prejudice, deep-rooted, is not to be overcome in a word, or a thousand words, and we are essentially a warmth-loving nation. So that there are still misguided lovers of the motor-car, and of sport in general, who lay up their cars for the winter so carefully that nothing short of the warm spring sun can thaw out their determination to hug the fire and leave the cold blast of forty miles an hour on the road for the enthusiast—"foolish enthusiast," they call him, who knows what the joy of a winter run is like. For such as these is this tale inscribed. The man who knows may enjoy hearing of others who know, but to him whose automobile is a matter for summer consideration only are these lines dedicated.

"Brrrring," went the telephone. "Hello!" said I. "How about Baltimore?" said a voice. "Hurrah!" said I. "Think you can make it?" "Sure," answered the voice; "got a new car, 104-inch wheel-base, side entrance, thirty horsepower, Pope-Toledo, best goer I ever sat in—climb like a cat!" "All right," said I. "When?" "Now!" came the answer, and down went the receiver and I hurried off after cameras and coats, sweaters and flannel shirts, goggles and caps and flasks and the rest of the impedimenta necessary to take a run such as was proposed and at the same time picture it for you to read.

For this was no ordinary run, from Washington to Baltimore and back, because two days ago had fallen a heavy snow, after a rain, and then a freeze. Then a wind! The result we could imagine—roads cut to pieces, frozen into ruts, cold, keen wind, sarcastic comments from those who thought they knew better—and we minded no one more than another.

We had no intention of trying to make a record going to Baltimore, or of turning either, for that matter, and that we made three, which, if unofficial, are still talked of in motoring circles locally was no fault of ours, but due to a wonderful car and a skillful driver. We didn't try to make a speed record going over, first, because the roads were so bad; and, second, because I insisted on stopping every little while to take a picture. Then the Prince hadn't had any breakfast and Royce said it wasn't safe to leave him too long without it lest he eat the tonneau, so we stopped for dinner half-way—but I am ahead of my story. We left Washington, after rolling through mud, slush and snow for a couple of miles, by the Bladensburg road, which you get to by traveling along "H" street northwest and then northeast, passing the massive work of the new much-talked-about Union station *en route*—the station which is causing the remodeling of so large a section of the city. Arrived at Fifteenth street northeast, we turned to the left, and had several miles of broad, well-laid road, not at all rutty and over which Royce tooled along at a speed so gently increased, a notch at a time, that it was hard to realize we were going fifteen miles per hour faster than the regulations allowed. But even had there been a bicycle cop within miles he would have been a good rider who could have caught the machine on that road—fine for big tires and long body, rough-shod indeed for a bicycle. However, it was no time before the brake slowed us up for Bladensburg and on request of some one—I won't say who—we stopped, ostensibly to take a picture of the pretty bridge and outlook as we entered historic Bladensburg, really I think to warm up frozen noses, stamp life into feet, or the lumps where feet were supposed to be, and readjust lap robes. For it was cold—my word, but it was cold!! I haven't an idea what the mercury said—I doubt I should believe it if I knew, but I did know that the thirty-mile per hour breeze we had made for our-



IN HISTORIC BLADENSBURG, THE OLD GEORGE WASHINGTON HOUSE CLAIMS THE DISTINCTION OF HAVING SHELTERED THE "FATHER OF HIS COUNTRY"

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selves had taken quite a grip on the exposed portions of our anatomy.

In a few minutes we started again and rolled slowly—very slowly, through Bladensburg. Maryland and Virginia are too close together to escape the contagion of bad roads, and, like all such places, the towns are worse, far worse, than the "pikes." Alexandria, Va., and Bladensburg, Md., are blood brothers in the matter of rotten streets, only Alexandria has stones and Bladensburg has holes—take your choice. Here we passed the historic George Washington House, which is said to be the identical hostelry in which Washington used to stop on his travels around Maryland and which is somewhat modern looking to bear out such a contention. But even a vandal may paint an old house, and paint, like charity, covers a multitude of sins.

As we rolled out of Bladensburg, followed by an admiring contingent of small pickaninnies, I had a sudden thought. "Royce," I shouted, "don't you think this heavy car is likely to do some skidding on some of these snow-covered hills?" "Haven't a doubt it would," was the reply, "but I have some anti-skids on, warranted to prevent it." Just then there was a sudden sound of flapping—"snap-snap-snap-snap"—and cries from the tonneau to "Hold hard—something's giving!" This something" proved to be one of the vaunted anti-skids, pigskin affairs studded with rivets and laced over the tires with rawhide thongs in hooks. And without knowing the maker of this device, or its efficiency under normal conditions, I should state here that for rough service they are better off in the show window. When there was any skidding to do, we did it, regardless of anti-skids, and when there was any coming off, in order, the anti-skids attended to it with care, so the car had to stop about every five miles so we could lace the things up, or cut them off altogether, and two we never did find. So much for the substitute for chains, or the other "real things" in anti-skids, where skidding is to be feared.

All through Bladensburg to Hyattsville, the "road" was about as bad as it could possibly be—ruts and holes and ice hummocks and natural and unnatural thank-ye-marms, compelling a very slow rate of progress and making us feel like loose peas in a wide pan, so shaken around and up and down were we. There was no question of going at a snail's pace to "save the car." "The car is built for rough work," said Royce, "and rough work ought not to hurt it." So we moved just as fast as the last endurable amount of discomfort would allow and steering permit. Through Hyattsville we rolled, and then—a stretch of good road and the road to Baltimore lay fair and white before us. To be sure, its "fair-and-white ness" was, in many places, a delusion and a snare, as when Royce carefully steered for the bottom of a wide, shallow pair of ruts, only to find them about a foot and a half deep, filled with muddy water and covered with a half inch of ice. Then it was "Duck, boys, the bath is coming," and some it did. showers of mud and water which covered us completely, and froze as it struck, so that two or three such incidents made us look as if we had traveled through the Father of All Mud Holes, instead of striking one or two ruts.

But little we cared for the mud and the water, except, perhaps, myself—a somewhat anxious time I had with two cameras and a plate-holder case but the

(continued on page 100)



A STEEP GRADE AND A BAD ROAD, ON THE WAY TO BALTIMORE



THE "OUT-AT-ELBOWS" APPEARANCE OF THE EARTH, AS THOUGH WINTER WERE WEARING OLD CLOTHES

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Evolution of the Motor Boat



By W. P. Stephens.

DIXIE—RACING TYPE OF AMERICAN LAUNCH. 1905. PROPELLED BY SMITH & MABLEY MOTOR OF 150 MOTOR-POWER. DESIGNED BY TAMS, LEMOINE & CRANE FOR EDWARD RUSSELL THOMAS, WHO IS AT THE WHEEL. LENGTH, 39 FEET 11 INCHES. CHALLENGER OF BRITISH INTERNATIONAL—HARMSWORTH—CUP

SECOND only to the flying machine in its absolute freedom of motion, the auto boat of 1905 is commonly accepted by the public as only another one of those many marvelous inventions which have appeared in rapid succession during the last decade. Even among those who may be ranked as experts in its construction or use there are few who realize its true position in the progress of the world as the last great stride in advance that marks a slow and lengthy process of evolution, of short and irregular steps, not a few of them in wrong directions or even backward. While it would be absurd to assume that anything like finality has been reached, it is at the same time evident that auto engineering on the water, as on the land, has in its present extreme forms approached very close to the limits of both materials and methods. In that reduction of weight which is one of the prime factors of speed in both motor car and launch, so much has been done within the past three years through insistent demands upon the metallurgist, the steel and bronze maker, and the machinist that the margin for future development in this direction has been greatly narrowed.

Far from being an independent invention, the motor boat of to-day is the result of years of development in steam and electrical engineering, in machine tools and shop methods; beyond these, it is made possible only through modern improvements in the production of steel and other metals, and in the perfection of gasoline and other similar fuels. As in the case of the almost simultaneous development of the motor car, every department of engineering, and of electrical, chemical and metallurgical science has contributed to the final triumph.

After nearly half a century of embryonic experiment, the propulsion of small craft by mechanical power attained a definite and practical form about 1880; the steam launch of from twenty to sixty feet coming into quite general use. There was at this time not only no other power than the steam engine and no other fuel than coal, but the methods of employing these agents were the same in the small launch as in the largest ocean-going vessels. The engine was heavy, bulky, built largely of cast iron, and in plan merely a miniature of steamboat or tugboat practice; the boiler was a shell, equally heavy and bulky, holding a great weight of water and consuming a large amount of coal. The plant as a whole occupied the greater part of the boat and was hot, dusty, smoky and oily, to the discomfort of all on board. Its great weight was a bar to all refinement of form of hull, and the speed was limited to less than a dozen miles per hour.

The typical steam launch plant of the late seventies rated at 12 to 15 motor power to drive a hull of anywhere under 50 feet, with a breadth of 10 feet and a draft of 4 feet, would include an engine with one cylinder of 8 or 9 inches diameter and 9 or 10 inches stroke, weighing about 1,200 pounds, the height of the engine being over 5 feet; the boiler would be about 4 feet in diameter by 7 feet high, with a total weight when under steam of upward of 3,000 pounds. The engine and boiler, of necessity placed in the center of the hull, would require at least 10 feet of length for the full breadth of the launch, with possibly extra space for coal bunkers, and the necessary weight of water in tanks and of coal would add a ton or two to the total weight.

Among the first to improve upon this crude and primitive plant were the Herreshoffs, of Bristol, R. I., men who, as pioneers in a new field, gave early promise of the great achievements which have since made them famous as engineers, inventors, yacht and torpedo boat designers, builders and sailmakers. Their work proceeded simultaneously along four distinct lines; adopting the two-cylinder compound type of engine, they refined both design and construction with special reference to the intended use, gaining efficiency and economy with a material reduction of both weight and bulk; abandoning the shell boiler with its bulk of water, they produced a practical form of watertube boiler, having coils or pipe in a sheet metal shell, very light in itself, containing but little water, and making steam quickly when first fired. The great reduction of both weight and bulk in the power plant enabled them to refine the form of the yacht, reducing the breadth and depth and especially the displacement; and this smaller hull, with a lessened weight of machinery and fuel, permitted a far lighter system of construction than was previously possible.

This new type of launch met with instant favor from yachtsmen, and many builders took up the same line, effecting further improvements in the engine, the watertube boiler and the hull. Coal was practically the sole fuel, though the obvious advantages of a liquid fuel such as kerosene in the convenience of storage, the avoidance of dust in filling bunkers, ashes and in firing, led many to experiment with oil burners.



OPEN STEAM LAUNCH—1880

BUZZ, HIGH-SPEED STEAM LAUNCH, 1887

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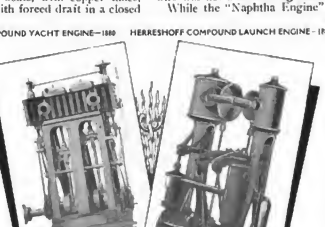
A very interesting point in the development of the speed launch is marked by the *Buzz*, later known as *Yankee Doodle*, in 1887. This yacht was designed and built by C. D. Mosher, of Amesbury, Mass., then an unknown student and devotee of high speed, but since well known in connection with some of the fastest yachts afloat, notably the *Ellide* and the *Arrow*. The *Buzz* was 30 feet over all, with 6 feet 6 inches breadth and a draft of hull of 1 foot 4 inches. Her engine had two cylinders, each 8 by 8 inches, and was very lightly built, with an open frame of bar steel and the least possible cast iron, the total weight of all reciprocating parts being but 33 pounds, the engine alone weighing 703 pounds, while the total weight of the complete power plant was but 4,700 pounds, or about 29 pounds per motor power. The engine ran at 600 revolutions per minute. The boiler was of the modified locomotive type at that time employed in torpedo boats, with copper tubes, working at 150 pounds and fitted with forced draft in a closed ashpit. With a displacement of 3½ tons the engine indicated 160-motor-power, a ratio never before realized. The *Buzz* easily made a measured mile in 2 minutes 30 seconds, and had a record of 2 minutes 8 seconds.

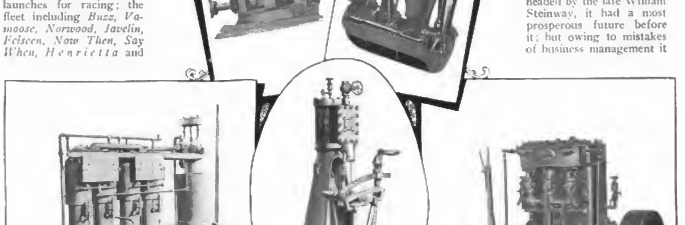
Between 1885 and 1890 there was much interest in the high-speed launch on the part of New York yachtsmen, the late Jay Gould, Norman L. Munro and others building launches for racing; the fleet including *Buzz*, *Vanoose*, *Norwood*, *Javelin*, *Feiseen*, *Now Then*, *Say When*, *Henrietta* and also as a medium for the expansive vapor, was light, compact, simple, and very serviceable; it was fitted for hulls of small displacement and fine form, and it could be placed directly in the stern of the boat, leaving the entire central space clear for the passengers. During the ten years in which it held at first undisputed and then partial sway, it revolutionized the whole course of launch development and added many hundred fold to the numbers of launches and launch users.

As in the case of the steam engine, which it largely displaced, the "Naphtha Engine" had certain fixed limitations of its own: the fuel was burned, giving off flame and heat, it was used under comparatively high pressure, and in large quantities, calling for a good tank capacity and involving an expense that has been proved unnecessary. Unlike the steam engine, it required but little attention, and might be run safely by a man who was not a skilled engineer.

While the "Naphtha Engine" was making its way rapidly and successfully in the United States, another new motor of an entirely different type was introduced in Germany, being first used in launches about 1887. This was the famous Daimler gasoline motor, the common parent of the motor and the motor-boat, the four-cycle motor invented and perfected by the late Gottlieb Daimler. When introduced to this country in 1889 through the American company headed by the late William Steinway, it had a most prosperous future before it; but owing to mistakes of business management it

COMPOUND YACHT ENGINE—1880 HERRESHOFF COMPOUND LAUNCH ENGINE - 1890





12 MOTOR-POWER GASOLINE MOTOR, DAIMLER 1890. WEIGHT, 1,300 POUNDS, EXCLUSIVE OF SHAFT AND WHEEL. FLOOR SPACE, 2 FEET, 5 INCHES BY 5 FEET; HEIGHT, 4 FEET, 4 INCHES

12 MOTOR-POWER LAUNCH ENGINE, 1880. WEIGHT, 1,200 POUNDS. FLOOR SPACE, 3 FEET, BY 2 FEET, 7 INCHES. HEIGHT, 5 FEET, 4 INCHES. WEIGHT OF ALL PROPELLING MACHINERY AND FUEL, THREE TO FOUR TONS

12 MOTOR-POWER GASOLINE LAUNCH ENGINE, AMERICAN TYPE, 1897. WEIGHT, 2,000 POUNDS. FLOOR SPACE 2 FEET, 3 INCHES BY 2 FEET, 2 INCHES

some others famous in their day for their racing prowess.

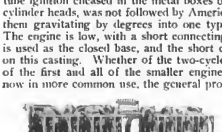
With all the improvements introduced by the Herreshoffs, Mosher and others, the steam launch possessed certain inherent defects and immovable limitations; coal as a fuel was in every way objectionable, but the attempts to replace it by oil were not successful; apart from this, the smallest and lightest boiler involved a waste of space in the center of the hull and an extra weight of water, while it made the whole boat hot and uncomfortable even for hours after the engine was stopped. In the natural course of events certain improvements in detail would in time have been made in the lightening of the boiler and the efficient use of liquid fuel, but the necessity for such improvements was largely removed by a diversion of the line of invention from the steam engine. The first effort in this direction was made in 1885 in the introduction of the now well-known "Naphtha Engine," first for the smaller sizes of yacht tenders, but later for the power plant of launches up to 70 feet in length. This engine, using naphtha as a fuel under the coil boiler and failed of success, and others reaped the benefits of the Daimler advertising and missionary work on behalf of the new power. Not only from its inherent merits as compared with its contemporaries, but from all that it has since become in the engineering world, the Daimler motor is entitled to at least a passing notice.

We have seen that in the early steam launch a weight of some three to four tons of cast iron, wrought iron, plate iron, coal and water were required to drive a 50-foot hull at a very moderate speed; a very close equivalent to this amount of power is found in the 12-motorpower Daimler, a four-cylinder motor occupying a floor space less than 5 feet long by 2 feet 6 inches wide and with a total height of 4 feet 6 inches. As this was all the space required for the machinery, and the gasoline tank occupied a waste space in one end or the other, and as the total displacement was less by three to four tons, a 50-foot launch might have moderate proportions and a hull capable of fair speed, and her accommodations would be greatly in ex-

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cess of the steam launch with machinery in the center. While the steam launch would require at least a helmsman and engineer, if not a fireman as well, one man could handle the gasoline launch alone. Had the exploitation of the Daimler motor been conducted with even a fraction of the energy and business ability displayed by its neighbor and rival, the "Naphtha Engine," the gasoline launch would have been as popular and well known in this country ten years ago as it is to-day, but as it happened its development was greatly retarded.

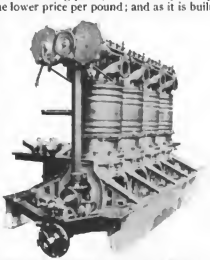
From 1890 onward the gasoline motor was built in all parts of the country; one of the first attempts was made in San Francisco, and a number of builders sprung up in the vicinity of Detroit, while there were, of course, many about New York. All had much to contend against in the way of the difficulties inseparable from experiments in manufacture, lack of capital, etc., and many of the first motors sold were defective and hurt the business for a long time. The Daimler motor, with its long, lofty cylinders surmounted by piping and its characteristic hot-tube ignition encased in the metal boxes on the sides next the cylinder heads, was not followed by American builders, most of them gravitating by degrees into one type, now well known. The engine is low, with a short connecting-rod, a box casting is used as the closed base, and the short cylinders set directly on this casting. Whether of the two-cycle type, as were most of the first and all of the smaller engines, or the four-cycle now in more common use, the general proportions and outline were the same.



CRAIG 250 M. P. MOTOR, 1905, IN ONONTIO AND VERITAS

The design of these motors was largely regulated by economic considerations, and practically no limit was placed on the weight. It is almost an axiom in engineering that cost is in inverse ratio to quantity of material; a frontiersman in building his loghouse will quickly fell a tree, shape it and place it in position, while a wheelwright in shaping a spoke for a light carriage will take all possible pains to select the right piece of wood, to shape it accurately and fit it tightly to place. Each piece of wood answers equally well for its intended use, but the smaller has cost considerably more than the larger. The case is the same in engine building, the pattern for the cylinder of an ordinary gas engine is of simple form, it may be moulded quickly in the sand by a fair workman, and the thick walls may be run in an ordinary grade of iron with little risk of failure. In the higher grades of work where lightness is the first if not the sole consideration the patterns themselves are intricate and complicated in form, requiring the most skillful moulders, only the finest grades of metal will run into the angles, passages and thin walls to make a perfect casting, and only the finest will give the necessary strength when finished. After all the extra expense of founding, there will inevitably be a very large percentage of defective castings to be thrown aside on inspection as worthless, thus increasing the proportionate cost of the few which will pass scrutiny. When it comes to the machining and fitting the same conditions maintain, where ordinary tools and men of average ability can turn out good work on the slow-moving heavy engine, the finest tools and the most expert workmen are essential to the proper construction of a racing motor, or, in fact, any high-speed engine. Where a steel casting or drop-forging may be in every way satisfactory for the heavy engine, only the finest grades of special steels, carefully forged by hand, bored hollow in all parts, and with all bearings ground to gauge are permissible for light work.

Down to a very recent date there was no real demand for other than the ordinary grade of work, and no commercial or business inducement which would warrant an American builder in departing far from the conventional customs of the trade. The users of gasoline engines, whether for pleasure or trade, made no objections to the weight, excessive as it now seems; it was far less than they were accustomed to in other forms of engine, and it lay much lower in the boat, merely taking the place of some other kind of ballast. With the ordinary type of motor the weight will average from 150 to 160 pounds per horsepower, even in the larger sizes, and the price per pound will be about 75 to 80 cents. In a light motor the average weight may be but 20 pounds per motorpower, the average cost being from four to five dollars per pound. As the usual model of cabin launch is likely to require a certain amount of ballast in any case, just as a sailing yacht, it is as cheap to buy the heavy engine at the lower price per pound; and as it is built more strongly and simply, and runs at a much lower speed, it will be the more durable both in everyday wear and in freedom from breakdowns. Under such conditions there has been a regular and growing demand for these engines; the users asking for improvements first in reliability and certainty of operation and then in economy of fuel, with little regard to weight.



DELAHAYE LAUNCH MOTOR. THE LARGEST FLIGHT-WEIGHT, HIGH-SPEED GASOLINE MARINE MOTOR YET BUILT. 300 MOTOR POWER W TH 2 500 POUNDS WEIGHT

It is rather interesting as a matter of abstract speculation to consider what would have been the natural outcome of this state of affairs had launch building in America been allowed to pursue its course without the influence of two purely external events, the perfection of the car motor in France and Germany and the installation of the same motor in launch hulls in the former country? Sooner or later the gasoline launch of 1900 would have been subjected to much the same process of refinement as the steam launch experienced at the hands of the Herreshoffs about twenty years earlier; the weight of the motor would have been cut through improvements in general design and method of manufacture and the use of finer materials to about one-third of the old weight, an average of from 40 to 50 pounds per motor-power, and this with no great change in actual price. The motor would have been improved both in certainty of operation and in economy of fuel, two important points. The lessened weights of motor and gasoline would have permitted a reduc-

(Continued on page 86.)



J. INSLEY BLAIR'S MOBO. FAST CRUISING TYPE OF AMERICAN LAUNCH. 1905 STANDARD MOTOR OF 110 MOTOR POWER. LENGTH. 75 FEET. BUILT BY ELECTRIC LAUNCH CO.

FANHARD AND LEVASSOR.—NEW YORK. 1905. RACER 39 FEET. 10 INCHES LONG. 90 MOTOR POWER MOTOR. HULL FROM ELECTRIC LAUNCH CO.

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MOTOR CAR LUBRICANTS

By W. F. Kimball

NOW that the motor car has outgrown its swaddling clothes, the question of its durability has become paramount. When a man buys a horse and carriage, he expects from them five to ten years of good service, and he knows approximately what the annual cost of their maintenance will be. In the motor car he sees greater possibilities for business and pleasure, but he does not wish to be obliged to face, at the end of a season or two, the alternatives of replacing it by a new one, or spending a considerable sum in renewal of parts.

When we reflect that—except for tire troubles and extraordinary accidents due to inexperience or carelessness in driving—the deterioration of any well-constructed car is mainly due to wear caused by frictional contact of the bearing surfaces (whereas the fundamental principle of lubrication is that moving surfaces should never be in contact at any point, but should always be separated by a film of lubricating material), it is obvious that there is a wide gap between principle and present practice in this respect.

Again, since wear is invariably the result of friction, worn bearings irrefutably indicate wasted energy. The cry of the motorist is ever for a sufficiently powerful engine, but he does not always realize how large a proportion of the power generated in his cylinders may be absorbed by friction ere it reaches the rims of his driving wheels. As a penny saved is a penny earned, so is power saved by efficient transmission and adequate lubrication, power gained.

Quantity and quality go hand in hand in the use of motor car lubricants. A moderate amount of a high-grade oil of such nature and so applied that it remains between the moving surfaces and reduces friction until entirely consumed, is infinitely preferable to a large quantity of an inferior grade, which floods the parts and runs to waste, yet lacks the "body" necessary to hold the surfaces apart and prevent wear, while often leaving a gummy residue behind to increase the coefficient of friction.

The problem of lubricating the mechanism of a steam or gasoline car resolves itself into (1) the oiling of the cylinders, in which the abnormal temperatures of the expansive gases must be reckoned with, and (2) the oiling of the bearings of the engine, and the transmission members which convey the power to the driving wheels.

Cylinder lubrication of steam cars differs in no important respect from that of high-speed stationary engines using superheated steam. A heavy, dark, purely mineral oil should be used, with fire-test not below 625 degrees Fahrenheit. But the conditions affecting the use of oil in the cylinders of gasoline engines differ widely from those of the steam cylinder. In the latter, the steam itself is to a certain extent a lubricant, and in its reciprocal passage through the cylinders, distributes the oil over their walls. With gasoline motors, however, in the cylinders of which several hundred explosions per minute occur at temperatures varying from 2,700 to 3,000 degrees Fahrenheit, there is a practical absence of moisture, and the burden of minimizing the great friction created falls entirely upon the oil introduced.

Mineral lubricating oils are almost entirely composed of carbon and hydrogen, and the heavier the oil the more carbon it contains. The temperature reached during gas engine explosions being far above the fire-test of any oil, some combustion of cylinder oil takes place. Where a medium-bodied oil is used, the proportion of carbon liberated combines with some of the oxygen of the air drawn in with the charge from the carburetor, and passes off with the exhaust as carbonic acid gas. But if so heavy a cylinder oil be used that more carbon is set free than there is available oxygen to combine with (for the explosion of the gasoline vapor in the charge consumes the bulk of the oxygen contained in the air aspirated) the excess carbon is precipitated on the cylinder walls, piston-head, and spark plug, where it is rendered incandescent by successive explosions and causes pre-ignition. Hence the heavy grades of oil, commonly used for steam cylinders, are wholly unfitted for use in gasoline engines.



GREASE FOR THE GEARS

This trouble with carbonization from heavy oils has led some car manufacturers to go to the other extreme, and adopt and recommend oils so thin that, while they do not carbonize, they have little lubricating value, particularly on horizontal engines (in which the cylinder has to carry the weight of the piston), and on air-cooled engines, which require an oil of higher viscosity than those of the water-cooled type. One of the best-known light gas-engine cylinder oils on the market, largely used on account of its freedom from carbonization, is merely a spindle-oil (i. e., an oil for lubricating spinning spindles in textile mills, for which purpose oils nearly as thin as water are used) under a new name, and, as such, has been sold to cotton mills for many years. Needless to say, it is a better spindle-oil than gas-engine oil.

As different cylinder oils are required for different cars, and as most oils, which work well in summer, become so heavy in winter that they clog in the lubricators and oil-feeds, besides making it a matter of main strength to crank the motor, most oil manufacturers put out three grades of gas-engine cylinder oil, known as light, medium, and heavy. Many garage proprietors, however, dislike having to carry two or three grades each of several brands, and for this reason one oil concern, after some experimenting, last season placed on the market a cylinder oil which it claims to be adapted for use the year round on any type of gasoline engine, whether air-cooled or water-cooled. While this claim seems rather broad, the oil nevertheless seems to have met with considerable success.

Next to the cylinders, the sliding-gear style of transmission, now used on the majority of foreign and domestic cars, suffers most in service from faulty lubrication. The use of ordinary gas engine oil to lubricate the gears and gear shaft-bearings by splash is open to several objections. It forms so little cushion between the gears, both while running in mesh, and when speed-changes are made, that considerable wear of the teeth takes place, and, as the constant agitation of the oil does not permit this metallic grit to settle, some of it finds its way into the shaft bearings, there causing abrasion and heating.

Besides the fact that this churning of oil by the gears wastes more or less power, the oil usually leaks out of the case through the bearings, and besmears the adjacent working parts, including the clutch, often making the latter slip. The low-grade steam cylinder-oils, commonly sold under the name of gear-case oil, remain in the case longer, but are extremely viscous, and have a tendency to thicken after continued use, or in cool weather, thus failing to distribute properly. The above is also true of the thin greases (composed of mineral oil solidified by the addition of various soaps) which are sold for this purpose, although these

(Continued on page 94)

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The Magneto.

BY ALEX SCHWALBACH.

LET me begin by telling what a magneto is, how it is constructed, how it operates, and what it does. After that will follow illustrations and descriptions of the few great and well-known systems of magneto ignition as applied to cylinder-fired, gasoline motor cars, dividing the system into two parts, high tension for the jump spark and low tension for the make and break spark.

Everybody is, of course, more or less familiar with methods of producing electric current by chemical changes taking place in cells whether of the dry or accumulated form whenever the circuit is closed, which is the reverse action of what takes place when charging cells from a dynamo.

In the ignition by the magneto system motor cars carry a small dynamo and produce the current direct as needed, and for an unlimited period, limited really only by the perfection of the apparatus, so that if the mechanical conditions are correct the source of electrical current is really a perpetual one. In the ease of



THE LACOSTE

the dry cell and the storage cell familiarity has, to use a trite phrase, bred contempt, because in case they fail they can be replaced almost anywhere or at any time, but with the limited knowledge possessed of the magneto and its operation there is difficulty at hand, more apparent than real, in finding an expert repairer.

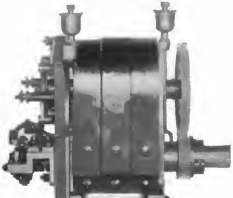
The use of a magneto on a high-priced modern motor car may be said to be a mark of high degree, especially so if a high-tension system is employed. So great is the difference in cost between a set of dry cells, or a storage battery, and a high-tension magneto, that the use of the magneto is almost prohibited on low-priced cars by this one fact alone. Dry cells can be bought for twenty-five cents apiece, whereas a high-grade, high-tension magneto costs $225. The argument against the use of the magneto because of the difficulty of repair is not a sound one, because if the operator of a car possesses mechanical ability enough to take care of his car it is an easy matter for him to add to that knowledge the theory and practice of the magneto.

The elementary points to be learned are those of magnetism and the action of the lines of force. The visible action and the properties of a magneto are well known, but the unknown form of it is the action of the invisible lines of force. Magnets are divided into two classes called permanent magnets and electro-magnets, the latter term indicating that the field magnets are magnets only when a current of electricity is passed through an insulated wire surrounding cores in many layers. This is the well-known type of magnet found in dynamo machines, such as are used for generating current for all purposes, even the charging of accumulators, but for various reasons is not altogether suitable for direct use for ignition purposes. It is a well-known fact that permanent magnets are not wholly permanent because the steel of which they are made has a certain saturation point, and it may be said this saturation point or limit cannot be maintained forever and must some time be remagnetized to its full limit, which is, however, a simple process, a description of which will follow later on. The magnets of an electro-dynamo are always giving a much higher current efficiency in proportion to their gross weight than a permanent magnet can ever give, and this is made possible by using for the H cores very soft iron of extreme purity which has a far higher saturation point than the hard steel, of which permanent magnets are constructed, it being also borne in mind that in ordinary dynamos the cores must also be able to rapidly lose their magnetism. This latter condition is not possessed by a permanent magnet, nor is it necessary for it to possess it for the purpose of motor-car ignition.

Magnets are usually made in a horseshoe shape, and whether the magnet is of the permanent type or not, or any other shape, they must have a north and a south pole, meaning that one end of the magnet will be a north finding pole and the other end the south finding pole. A north pole of one magnet is attracted by the south pole of another magnet and poles of similar sign will repulse each other, so that if the magnet is made into the common horseshoe shape one end will be south, the other end north, and there will be an attraction from pole to pole across the intervening gap, and this gap or space is called the magnetic field, varying in its intensity as the strength of the magnets varies and the closeness of the poles. The invisible lines forming this magnetic field are called the lines of force.

A simple experiment, as shown in Fig. 1, illustrates the way in which the magnet acts, and these invisible lines of force are readily made visible by sprinkling some fine iron filings or lathe turnings on a sheet of white paper and demonstrating them with a magnet. Take the single pole formed by one end of the straight bar of magnetized steel and place it vertically under the center of a sheet of paper, when it will be seen that it attracts the filings to it with great regularity, and when these are disarranged and then allowed to rearrange themselves they again take up with great uniformity this formation. In a complete magneto apparatus constructed with horseshoe shape magnets this magnetic field is situated in a tunnel-shaped extension at the magnet ends, which are called "field" magnets because at this point and for this object the magnets are made thicker in cross section and bored out to a circular shape, conforming to the size of the armature to be used.

This construction will be readily understood by referring to Fig. 2, which in diagrammatic form shows the pole pieces of field magnets with a tentative armature made of a really

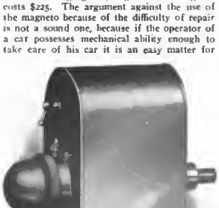


THE EISEMANN

simple form, of two loops of wire having a wire by which it is rotated in the magnetic field.

One of the well-known properties of electricity is that the movement of a conductor placed in a magnetic field will set up in as coils a current of electricity and that by some suitable method this current may be gathered up and carried away to do work on the outer circuit. By looking at Fig. 1 it will be noticed that any motion of the armature will disarrange or cut through the lines of force, as illustrated by the filings, and in a direction closely following that of the rotating armature but usually seeking the pole piece of the opposite side, so that when the armatures are at rest the lines will take a straight path through the armature as a conductor directly from the north to the south, as illustrated by the dotted lines in Fig. 3.

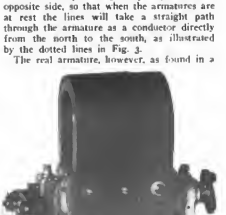
The real armature, however, as found in a



THE REMY



THE SIMMS-BOSCH



THE LOCOMOBILE

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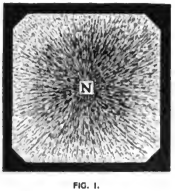


FIG. 1.

Where a permanent magnet is used for magneto ignition, magnetism may, of course, be set up by various ways. Figure 4 shows the ordinary method by which a strong current is made to circulate through an insulated conductor wrapped closely around the U-shaped magnet M, the current being first passed through the resistance board R, the magnet M being made from a rectangular bar of high-quality cast steel. It is obvious that the finer the purity and the harder the steel the higher will be the saturation point, and the more intensified will be the magnetic field with the corresponding increase of lines of force.

The resistance board, which nets as a regulator, is not always necessary, especially if a direct continuous current is at hand, but it is useful as a distributor where the current is being drawn from different sources. It is to be noted that the current enters at A and passes through the resistance switch and around the magneto, as indicated by the arrow. The coil on the far side of the magnet is shown by dotted lines, and the path of the winding must be carefully followed, because in remagnetizing a magnet which has become somewhat weak, it is essential that the current should flow in the same direction as originally, otherwise the polarity of the magnet will, of course, be reversed. The magnet is U-shaped, but if the winding of the wire is traced it will be seen that it follows a path in a continuous coil, as it might do when wrapped around a straight bar, a wire W being brought from behind one side and in front of the other. The wire ordinarily used for this purpose is of fourteen or sixteen gauge, double covered, varying, of course, according to the amount of the current to hand, it being borne in mind that the magnetic effect is produced by the amperes, not by the voltage, so that a dynamo giving a big current and low voltage is better for remagnetizing than a high-voltage circuit which might waste all of the current in useless resistance.

Figure 3 shows an armature in position in the magnetic field, fitted with a two-piece commutator. Now, if the conducting brush should make an unbroken contact with the revolving armature, the current would be alternating and fluctuating from maximum to zero, varying with the position of the brush and the rotating armature, in relation to the maximum lines of force, but by using two brushes and a two-piece commutator, as shown in Fig. 3, the brush passes the gap from one segment to another, and the current is reversed and becomes a continuous one, at all times flowing

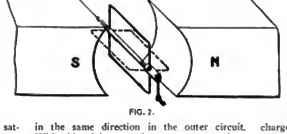


FIG. 2.

in the same direction in the outer circuit. With this plain, two-piece commutator there will be a constant variation of strength of current, so that it becomes necessary in order to furnish a continuous current which will be constant in power to split up the commutator into more sections, each section connected to its own section of the winding of the armature, the idea being that no sooner has one section passed the point of the maximum influence to cut into the lines of force than another takes its place.

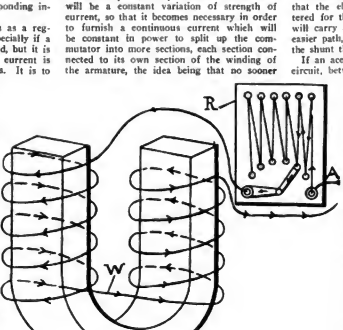


FIG. 4.

In Fig. 5 is shown in section a magneto of permanent magnets, M, and pole pieces, PP, with a twelve-point commutator, C, and windings to match on the armature, A, the brushes being directed opposite to each other and mounted on a movable rocker, so that the maximum effect is had, according to the speed of the motor and the armature revolution, this being phrased "angle of lead," and which allows for the dragging forward of the lines of force in the direction of rotation, so that it will be noticed that where a constant current is required the greater number of sections in the winding of the armature the better.

In a machine of this character it is only necessary to carry the current to a suitable point in the cylinder of the motor, and then make some mechanical arrangement for breaking the contact at the correct position of the piston stroke, when the igniting spark will be had, although some extra mechanism must be fitted for advancing or retarding the spark.

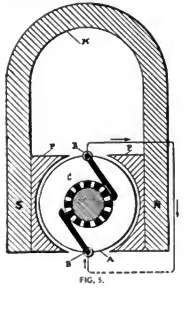


FIG. 5.

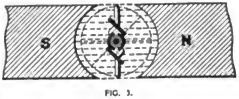


FIG. 3.

To thoroughly understand the principle of the dynamo Fig. 6 has been arranged. In this the whole of the case is non-magnetic, until a current is caused to flow around the cores, CC, which are bolted with a crosspiece or yoked, Y, forming a complete magnet, having south and north-pole pieces and a twelve-point commutator. Following the arrows and dotted lines around the core from the brush, B, back again to the lower brush, E', it will be seen that there are two paths open to the current from the armature, and given off at B. One of these is a closed circuit, directed from B to B'; the other is broken at D so as to work in the outer circuit, shown by the dotted lines from D to D', where the regular circuit is joined at B'. But this type of machine is not used for direct ignition. It is, however, useful for motor cars where it is desired to charge accumulators while running. This type of machine is merely referred to here in order that the elementary principles may be mastered for the "series" winding from B to B' will carry all the current cast off, giving an easier path, and through the finer winding of the shunt through D-D'.

If an accumulator were placed in the outer circuit, between D-D', the accumulator, having but little resistance, would receive no current at all, but if in series with the accumulator, between the points D-D', a high resistance were placed, then the dynamo would work up enough energy to overcome the resistance and pass a current through the accumulator, according to the resistance, which is in itself variable.

One of the best-known magnetos is that produced by J. Lacoste & Cie, of Paris, long known as makers of the Lacoste induction coil. A Lacoste magneto embodies the whole induction outfit. There is no induction coil, no batteries, no commutator, only a magneto, which runs at the same speed as the motor, and is wired to the spark plugs. It measures 5½ by 11½ inches, and is 7½ inches high. It weighs about twenty-five pounds, and can be furnished to run either to the right or to the left. M. Lacoste has been experimenting on

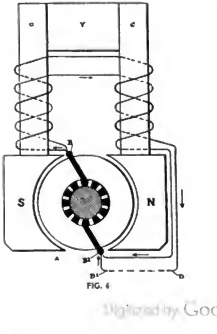


FIG. 6

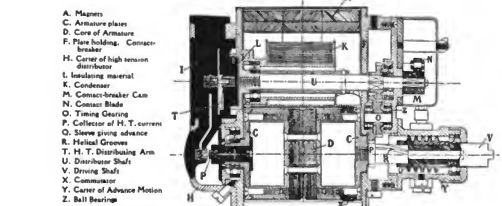
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this high-tension magneto during the whole of the last two years, and when it is said that it is perfected, and is sold with a guarantee that its mechanism is as fine as that of a chronometer, nothing more need be said. Mr. Leon Rubay, the American agent for the Lacoste products, says that the Lacoste magneto may be best described as follows:

This type of magneto does not differ in principle from other well-known types with double winding, save that it is constructed in altogether a special manner, with a view to enclosing and protecting all parts from dust and damp, insuring reliability and immunity from break-downs.

Following the description of the magneto it will easily be seen that the security against breakdown is as great in this as with an ordinary induction coil. The high-tension current is produced in the same way in both cases, with the difference that in a coil the current is supplied by an accumulator, whereas, with the magneto the current is produced by the magnetic field of the permanent magnets.

The armature of a high-tension magneto has a double winding, consisting of two coils of wire; the one coil is composed of thick wire, the other of a considerable length of very fine wire. The armature itself revolves in the magnetic field produced by the permanent magnets. At each one-half revolution the magnetic lines of force induce a current in the armature, proportional to the strength of the magnets, the speed and number of turns of



VERTICAL SECTION. LACOSTE MAGNETO

wire on the armature. The circuit of primary winding of armature is closed through a contact-breaker, while at the moment the armature begins to revolve an electrical current is generated in the winding, increasing in strength progressively until the polarity of magnetic field begins to change. At this moment if the circuit of primary winding is broken, a current is induced in the secondary winding of the armature by the rapid demagnetization of the iron core of armature. As the secondary winding has a large number of turns of wire, the current produced is of high voltage and will jump an air gap. The rapidity of demagnetization of armature core is increased by the addition of a condenser. The condenser is composed of strips of tinfoil, insulated by paraffin waxed paper. The large surface obtained in this manner absorbs the current induced in primary winding at the moment of breaking its circuit.

The high tension current having been produced in the secondary winding of armature, this is conveyed successively by means of a high-tension distributor to the various contacts leading to the sparking plugs.

The Lacoste magneto is composed of a series of permanent magnets, held at their lower extremities of like polarity, to two soft iron blocks, which in their turn are securely fixed to an aluminum base, the two soft iron blocks, semi-circular in shape, forming a channel in which rotates a laminated armature with double wiring. The one end of each armature winding is connected to mass. The other end of primary winding is connected to a metal disc, from which the current is collected by two carbon brushes. These brushes are connected to the contact-breaker by means of an ordinary low-tension "on-and-off" switch. The two soft iron blocks support at each end an aluminum plate, holding the bearings and movable parts of the magneto. These plates completely enclose the armature and other working parts. One of these plates is made in the shape of a carter, enclosing the small gear wheels, giving two to one motion for high-tension distributor, the driving shaft of the magneto turning at the same speed as engine. This same aluminum plate also supports the contact breaker and advance lever.

In order to obtain the advance, the driving shaft of the magneto is in two pieces, abutting each other and coupled by means of a sliding sleeve. The two ends of abutting shafts have a right and left helical groove cut in them, the sleeve having four teeth engaging in these grooves; by moving the sleeve one way or the other along these grooves, the relative positions of abutting shafts are altered, the one being moved in advance of the other. The movement of sleeve is obtained by a small lever placed in a convenient position for coupling to an advance quadrant. The sleeve turns with the shaft, and on account of there being no end thrust on sleeve, owing to formation of the grooves, the friction is practically nil; also the whole of this mechanism is enclosed in its carter and thus runs continuously in oil.

Parallel with the armature, placed above it, is the contact-breaker shaft. This shaft is worked from the main shaft by an intermediary gear wheel, in mesh, with the two gear wheels on main shaft and contact-breaker shaft. To the outside aluminum plate is fixed a cam, giving required lifts to platinum-tipped blade to interrupt the circuit. This blade, which is fixed to the mass, is in contact with a platinum-tipped screw connected to one end of the low-tension circuit, the other end of low-tension circuit being connected to mass.

At the moment when the current in low-tension circuit is at its maximum, the cam gives a quick break of the circuit by lifting the contact blade, thereby disconnecting the contact screw from mass. The high-tension current is then induced in the secondary winding of armature, and conveyed to the plugs by means of high-tension distributor.

The high-tension distributor, which is the weak point of some magnetos of this class, is in this magneto entirely enclosed and adequately protected from dust and damp. The fixed portion is composed of a special insulating material, moulded under high pressure.

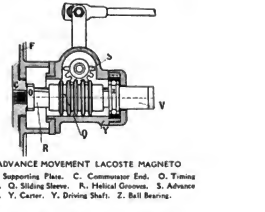
The contact pieces are countersunk flush in this insulating material.

The distributing arm consists of an ebonite disc, supporting a small steel arm. This disc is fixed to the distributing shaft and is made to revolve, as before mentioned, at half the speed of the main shaft of magneto. In its rotary movement the distributing arm is made to come into contact with the contact plates connected to the sparking plugs.

All the organs of the magneto are absolutely protected from dust, mud or rain, ball bearings are used throughout and require practically no attention. These are lubricated sufficiently for the last several months, and a few drops of thick oil are sufficient for a run of several hundred miles.

The magneto never requires taking to pieces. If, however, it is required to give it a cleaning, care should be taken to replace all parts, gear wheels, etc., in their correct positions, corresponding to identification marks, which it would be as well to place on these parts before taking to pieces, as this will greatly facilitate putting the magneto together again. In order to verify the timing the piston of No. 1 cylinder should be brought to the end of its compression stroke. The cam, No. 1, of magneto contact breaker should at this point begin to lift roller of contact blade in order to break circuit at correct moment. The advance lever should be in neutral position, giving neither advance nor retard of the sparking.

To those "in the know" and able to see the handwriting upon the wall, the coming of the magneto ignition is apparent, and although its progress has been slow, it has been sure, and during the coming season many makers will



ADVANCE MOVEMENT LACOSTE MAGNETO

F. Supporting Plate. C. Commutator End. O. Timing Gear. Q. Sliding Sleeve. R. Helical Grooves. S. Advance Gear. Y. Carter. V. Driving Shaft. Z. Ball Bearing.

give buyers the option of having either magneto or battery ignition, and in some cases both systems will be fitted, the magneto being used for doing the work while running and the batteries for starting up by the switch, the battery adjunct having this advantage, that the operator is able to start up his motor by merely moving over a switch, which saves a lot of cranking, and also dismounting from the car.

The question of price appears to be at present the only thing that will retard the rapid advance of the magneto ignition into popularity. A few great makers control the patents and the output, so that until this output is increased prices will be maintained. As regards the popularity of the two systems of the magneto ignition, the make-and-break, and the high tension, it must be said that with the recent development of the high tension system many of the previous objections to the magneto principle have been dissipated. With some of the early low tension of magnetos mechanical troubles were more than frequent. Like everything mechanical there were parts, such as springs, bearings, and axles, that were liable to wear out. All these minor mechanical difficulties have been corrected and as in the high tension system the standard style of plug is used, so that it is readily fitted, it is more commonly used. As far as the make-and-break system is concerned it does require more or less attention, but after all this attention when summed up is almost negligible in its total. Of course, it is possible that some weakness may arise in the amateur by breaking down of the insulation, or a short circuit, but these faults are rare indeed.

(To be continued.)

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MODERN MOTOR CARS.

No. 6. THOMAS "FLYER"

THOMAS. E. R., of Buffalo, is of so optomistic a nature that no one who knows him would ever think of calling him a doubting Thomas. That this statement is founded on fact is evident by a look at his career, so that before looking forward to what the E. R. Thomas Motor Car Company is about to produce in 1906, a look backward, to see what led up to this year's construction, is interesting.

Like many other of our great motor-car manufacturing magnates, both here and abroad, he first became interested in mechanical motion by means of the bicycle, for Mr. Thomas was managing partner of the great Cleveland bicycle factory at Toronto in 1895.

In 1898 Mr. Thomas imported the first motor car brought into Canada, and the same year began the construction of motor cars.

In 1899 Mr. Thomas was Vice-President of the Canadian Cycle & Motor Company, but resigned to engage in the manufacture of motor cars at Buffalo. In this year he designed the first commercially practical motor bicycle, which in 1900 he produced in large numbers. In this year he made the Buffalo Junior, a three-motorpower runabout, with a narrow tread and a short wheel base.

In 1901 he put out a seven-motorpower runabout with a horizontal motor, which was called the Buffalo Senior. Seventy-five of these were made the first year.

In 1902 a tonneau was placed on this runabout, this being the first time a tonneau was ever sold as low as $1,000.00. This was called model 16 and one hundred and twenty-five of them were made in this year.

In 1903 model 17, a 10-motorpower machine, single cylinder, and with a planetary transmission, was placed on the market, as was also model 18, a single cylinder, 7¼-motorpower car, with sliding gear transmission. One hundred and seventy-five of model 17 and 18 were placed on the market in 1903.

In 1904 model 22, the first of the Thomas Flyers, was manufactured. This was a 24-motorpower, three-cylinder car, and is the one still used by Prince Pu Lun, heir apparent to the Chinese throne. Two hundred and twenty-five of these machines were made and sold during the year.

In this year also the E. R. Thomas Motor Company and the Thomas Auto-Bi Company were made separate institutions.

In 1905 the four-cylinder style of motor was adopted, together with the side entrance tonneau, and cars of 40, 50 and 60-motorpower were made. Four hundred and two of them in all.

In 1906 one model is being made—No. 31. It is a 50-motor-power, side-entrance tonneau, and six hundred of them will be made.

In the construction of the Thomas 1906 model a number of radical changes have been made, incorporating a number of ideas that lead to results recognized as the best possible in general motor car construction.

The wheel base of the car has been increased to 118 inches, and the frame rails made proportionately wider, longer and stronger. The rails are made of the best grade of cold-rolled steel, high carbon, cold pressed in form, and are also trussed with strong steel rods, doubly supported, thus eliminating all possible danger of buckling, settling or breaking.

In the motor the same practice of casting is still followed, the cylinders being separate, with the water jackets integral. This year both the inlet and exhaust valves are mechanically operated, they being located on opposite sides of the motor. All valves are interchangeable.



THOMAS "FLYER" MODEL 31

The cylinders are each 5½x5½ inches and develop 50 m.p. They have forged nickel-steel connecting rods with five large bearings. The five eccentric piston rings are ground to 1-1,000 of an inch. The wrist pin is of steel, hardened and ground. The oil pit can be removed without disturbing the shaft bearings. The chain oilers on the main bearing hold sufficient oil for a run of 750 miles.

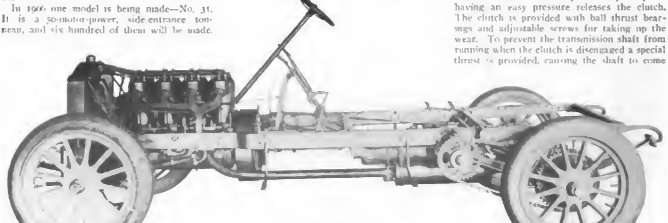
The cam gears for operating all the valves are of the combination type, with wide face and coarse pitch, thus making them strong and noiseless. These gears are located externally of the base and are protected by an aluminum shield. To the motor is attached a large geared water pump with a capacity of twelve gallons a minute when the motor is running normally.

For cooling purposes a cellular radiator is employed, of ample capacity, to which is attached a fan operated directly from the motor and driven by a wide, flat belt. The radiator is increased in size 25 per cent. The motor is bolted directly to the steel frame, and so set as to allow ample room for the compression of the springs without interfering with the axle.

Tubular axles have been done away with and replaced by the drop-forged, I-beam type, made of the best steel, and for this purpose carefully treated to withstand all shocks, stresses and strains. As the pads for attaching the springs are a part of the axles there is no possible chance of a break occurring at those points.

The cone clutch has been abandoned for that of the disc type. The gripping surface is the largest the diameter of the fly wheel will permit. It never grips fiercely, but always slowly and gradually, but when it is once engaged it cannot slip. The driving disc is of the finest quality of manganese bronze, securely riveted to the sliding hub of the transmission shaft, which is squared, and thereby absolutely positive in its function. The clutch can be run either with or without oil, although it is recommended that it be slightly lubricated.

The clutch is really a metal-to-metal, three plate device, with a center plate of manganese bronze, the two outer plates being of the finest grade of gray iron. The manganese plate being the transmitting member is fitted with a series of holes filled with the best grade of cork cushions which not only prevent any noise, but also prevents the motor from gripping too fiercely, which might cause the car to start with a jerk. A push pedal having an easy pressure releases the clutch. The clutch is provided with ball thrust bearings and adjustable screws for taking up the wear. To prevent the transmission shaft from running when the clutch is disengaged a special thrust is provided, causing the shaft to come



THOMAS CHASSIS

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to a standstill and enabling the operator to shift the gears easily and without noise.

Radical changes have been made in construction of the transmission, especially in the size of the gears. Last year they were ⅞ of an inch in width, but are now 1¼ inches wide. They are of special, drop-forged steel and have a larger diameter. The forward main-shaft is fitted with a roller bearing, and the rear main-shaft, sliding shaft and the counter shaft are fitted with Hess-Bright bearings, making a total of seven Hess-Bright and one roller. All the large gears are made detachable, so should a breakage ensue or any damage necessary replacement may be made speedily and will cost very little. The manipulation of the gears is of the selective type, making it unnecessary to shift the intermediate through gears in moving forward or back in the changing of speeds. The transmission of power to the rear axles is through the medium of two side chains, which are increased in size over those of former models. They are of the roller type and with perfectly cut sprockets, insuring noiselessness. The pull of the chains comes between the bearings of both rear axles.

All gears in the transmission are drop forged, carefully hardened and tempered. All the large gears are detachable. There are four forward speeds and a reverse. The auxiliary shaft is disengaged when the high speed, which is by direct drive, is on, the shaft remaining idle. The differential is in conjunction with the transmission case, and has been greatly strengthened by the addition of another set of pinions, thereby increasing the strength 33 1-3 per cent., the gears being of the spur type.

The carburetor, while still of the automatic type, has been improved and conveniently located, making it more accessible. It is manipulated from the top of the steering wheel, as is the lever for advancing and retarding the spark. It is directly connected with the emergency brake with an independent throttle, acting as a governor when either the foot or emergency brakes are applied, preventing any possibility of the motor racing. It is provided with means for taking either hot or cold air.

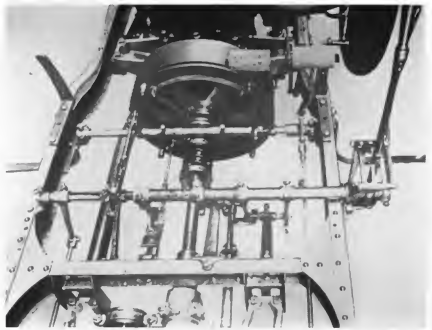
A first-class mechanically-operated oiler is placed on the dash, the tank being of ample size and fitted with six sight feeds, four of which lead to the cylinders and two direct to the crank case. Oil is delivered through individual pumps, thus making the delivery positive. In addition to supplying oil to the crank case from the tank an individual oil cup is provided, insuring a plentiful supply. Lubrication is by the splash system. In charging the case with oil two pet cocks are so located as to indicate the proper level when the case is filled.

The ignition system is the same as that which has been employed for two seasons past—that of the single-unit coil and jump spark, in conjunction with either direct cells or storage batteries. Provision has been made, however, for attaching any of the successful recognized magnetos. These may be directly attached to the motor and gear driven.

The commutator has been greatly improved. The bunch of wires which has been gathered about it in former years has been done away with, and they are now entirely out of sight. It is attached to the dash and positively gear driven.

The brakes are four in number, two on each rear wheel and are of large dimensions. Two of the brakes are of the internal expanding type and are operated by the foot pedal and the other two are external and are operated by the emergency lever, but both brakes are connected in such a manner that with one movement of the emergency lever all brakes are applied, the clutch is disengaged and the motor throttled, but the foot brake is of such ample proportions and strength that by its use alone the car may be held at a standstill on very heavy grades.

The hill climbing safety device used on the Thomas cars is well known as an element of safety. It is retained this year, although the strength of its construction is greatly increased. This device consists of rachets on the outside of the rear axles into which a dog slips by the working of a small lever at the right hand side of the operator. This is guaranteed to hold the car from backing down hill in case of emergency without the use of any brakes. It can be engaged or disengaged while the car is traveling at any speed.

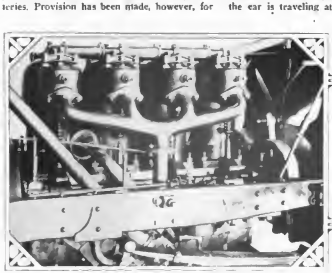


THOMAS "FLYER." SHOWING CLUTCH, LEVER, AND PEDAL

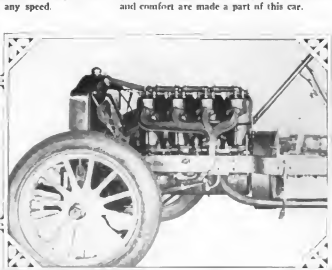
The same well-known, graceful body construction of the Thomas Flyer will be continued; which, in fact, is a modification of a "King-of-the-Belgians" body in side entrance form.

A fine body has long been noticeable as a strong point of the Thomas Flyers and special efforts were made to improve on it this year. This was found to be a difficult proposition, and the only changes decided on are the rounding of the corners on the rear seats and also a slight improvement on the corners of the forward seats, which with the increased width of the doors of the tonneau make ingress and egress from it much easier. The general construction of the rear and sides of the tonneau, which have been found to be practically dustproof, have been retained. The rear seat is wider than before and the tonneau is fitted with two collapsible revolving seats, which can be stored under the cushion in a compartment under the rear seats. This enables five people to ride comfortably in the back half of the car. Three designs of body are made—the Touring car, Limousine and the Landaulet.

The dash is made of aluminum housing and is shaped to conform to the hood. Lockers are situated on each side for the carrying of small tools and small extra parts. The framework of the dash will be finished in natural wood or mahogany. Many other little ingenious arrangements adding to convenience and comfort are made a part of this car.



THOMAS MOTOR. INLET SIDE



THOMAS MOTOR. EXHAUST SIDE

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SOCIETY FOLK WHO MOTOR

By Priscilla Speedwell



THE DUCHESS OF MARLBOROUGH AT THE MOTOR RACE FOR THE VANDERBILT CUP

The Duchess is leaning forward. To her left stands Mrs. E. R. Thomas, with the score-card in her hands.

THE motor car, as the writer has always maintained, helps people to be happy though married. Even the young man and matron who belong to the very innermost circles of the smart set, if they have a habit of going off on trips in their motor car sometimes stay together long enough to celebrate the wooden wedding in sincere amity, though affected merriment. Mr. and Mrs. Irving Brokaw, who have returned from abroad, after a long motoring trip through France, Germany, and Switzerland, are a young couple who each year seem to grow more "devoted." Mr. Brokaw, who is a brother of Howard Brokaw, seems to love his motor car—Renault — better than any polo pony. Several seasons ago, at Monmouth Beach, Mr. and Mrs. Brokaw gave up their horses almost entirely for their motor car. Mrs. Brokaw, who was Miss Lucille Nave, of St. Joseph, Missouri, is a sister of Mr. Samuel E. Nave, who married Ruth Addy.

* * *

AFTER seeing "Peter Pan" one realizes how much fun it would be to have a flying machine. Peter (who is Maude Adams) flies into the nursery through the high windows, rouses the sleeping children, and teaches them to fly. So off they go, with Peter in the lead, flying away to "Never Never Land." The motor cars that glide through our streets would have once upon a time been adjudged improbable. So, in the days to come, it is just as likely we may fly through the air. Already we have the Aero Club, composed entirely of motorists, mostly members of the A. C. A. Exclusive society, when this sort of locomotion (flying) comes true, will have the rarefied atmosphere it desires. How Mrs. Ogden Mills will ascend to the ether on high! "Do you believe in Fairies?" is the query of Barrie's play. "But do you believe in the future of flying machines?" is another query raised in the minds of people and the Aero Club.

* * *

FOR His Serene Highness there was a naval parade, but for Her Speedy Highness there should be a motor parade. For Admiral Prince Louis of Battenberg there was the pow-wowing of American vessels around the British battleships. For Margherita, Queen of Italy, there should be a motor parade. When she comes here next year—as she now announces—she will bring with her a forty-motorpower FIAT. During October Her Speedy Highness returned to Turin, after a journey of five thousand miles in her car. Margherita, the Queen Mother, is a most lovable sovereign. Most democratic is this Dowager Queen, and the motor car has done much to make her so. Traveling in her car incognito, she has journeyed far from the royal confines, both literally and figuratively. Like the George Goulds, and many of our American motorists, she was an ardent bicyclist before she became a devotee of the car. Instead of the Indian shawls, that became known as the special gift of Queen Victoria, this Queen of Italy gave bicycles for presents. Of course, motor cars it is impossible to distribute among one's relatives and subjects so generously as the corn one scatters to the turkeys and chickens on the farm.

* * *

MRS. GEORGE B. DE FOREST (and it is not such a far cry from Italy's Dowager Queen to this lady, for her brother, Robert Hargous, until very recently, owned a palace in Venice) goes spinning around New York in a Pope-Waverly electric runabout. In a modish gown, of her favorite dark red, and a Frenchy hat, such as one might wear at an afternoon tea, one sees her



Photograph by [illegible]

MRS. EDWARD R. WHARTON

Mrs. Wharton, known in the literary world as Edith Wharton the author of "The House of Mirth," the book now creating so much comment is one of the lady-motorists of Lenox, Massachusetts. The Berkshire home of Mr. and Mrs. Wharton is near the house that Fanny Kemble the famous actress, once occupied.

seated alone in the car, calmly gliding between vehicles on the crowded street. Up Fourth avenue she sped one day, and as she is seated rather high in the little car, the passersby stopped to stare after her motor. No thick veils and no bushy motor coat hide her identity—unlike so many of the motoring celebrities. The majority of them when they attend outdoor events, like the Long Island Horse Show, wear their chins in a sling, as a protection from the camera sharp-shooters and the curious public eye. Mrs. Thomas Hastings, Mrs. Herman B. Duryea, and Mrs. Reginald Brooks are among those who wear chin slings of brown chiffon. For instance, you pin your veil, with no ends flying, where the hat and hair meet in back. It makes a sling that just holds your chin and covers the tip of your nose, only showing your eyes. Thus you look out upon the world after the manner of a harem beauty. So, if you have very great wealth and prominence—or it will be convenient if you only have pimples—you wear your chin in a sling.

* * *

THE Musical Montants will now be known as the motoring Montants. Such fine dinners they have given in the past for opera singers, prodigies and virtuosos. Society, with a large "S," doesn't satisfy them unless it has brains. But at present the special reason for their being in the social corner of the "public eye" is the fact of their having completed such a wonderful motor trip—so many thousands of miles *sans* accidents—in a Richard, I think. Mr. Montant has compiled a guide-book with directions as to roads, and the right turn to make on leaving villages not down on the map. Their journey, which included the Cathedral towns of England, Southern France and the Riviera, was remarkable because they met with no accidents or breakdowns. No records were broken, but neither was their machine. Next year they will tour through Tunis and Algiers.

* * *

THE diamond horseshoe at the Metropolitan Opera House is now ablaze again for the season of 1905-06. Heinrich Conried, who motored all over Europe (he made the whole journey in his car) in search of new tenors and sopranos, is now all abeam with joyful satisfaction. Between the acts we almost expect to hear him crow the "cock-a-doodle-doo" of naughty "Peter Pan." It would be difficult to find, in that diamond horseshoe, a single boxholder who is not devoted to motor cars. Jack Astor, for example, has twenty cars. Then the crowding of vehicles, as the boxholders leave, will be much improved by the use of the electric brougham. Compared to the carriage with horses, it takes up less than half as much room.



MRS HARRY HAMLIN

Mr. and Mrs. Hamlin were among the first of the residents of Buffalo to adopt motoring. They are now at the Holland House. When in New York they always have their touring car with them. Mr. Hamlin is a son of the late Cicero Hamlin, the well-known lover of horses. Mr. and Mrs. Hamlin have spent much time at Newport and in touring New England. Their son married a sister of David Gray, the author of "Gallops."

Motor Car Forgings

BY THOMAS J. FAY, E. E.

IN the construction of motor cars the cost may be high for two precise reasons, viz.:

(a) For the reason that small lots are whittled out by a laborious process.

(b) By virtue of the use of the highest grades of alloy steel, even assuming that the process is refined.

Quality in a motor car is not of necessity the direct product of a shop in which the cost is high, nor is it fair to say that in a low-priced car *quality is absent.* Quality must be denoted by some measure of utility per dollar of cost, or, better yet, the ability to serve the intended purpose, without respect to cost.

A properly designed part of any car in which the material is suitable for the purpose, is all that can be used in any case; hence it is plain to be seen that the question of cost is entirely a separate matter.

Now, as to the question of cost, considering it as an entirely separate matter. Since, as before stated, the cost may be high for either good or for bad products, it goes almost without saying that any process that will reduce good, raw material to good finished products, quickly and cheaply, is the best process to employ. To suggest drop-forgings then is a natural sequence, but to conclude that any drop-forging will do, simply because it is a drop-forging, is to court an infinite amount of trouble, since,

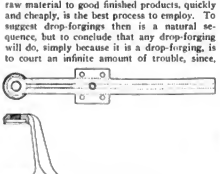


FIG. 1—NICKEL-CHROME-STEEL FRONT AXLE. OIL TEMPERED AT 900 DEGREES C. ANNEALED AT 570 DEGREES C.

forsooth, in drop-forgings, as in diamonds, some are good and more are not.

The problem, then, is to fix upon the quality desired and the places in which drop-forgings may be advantageously employed, but there being upward of one thousand separate parts in a first-class touring car, to discuss each part upon its own merit would require much space and a vast amount of time. Hence, for the sake of brevity, it will be necessary to confine the discussion to important members.

In the first place, considering drop-forgings, it may be well to discountenance the use of any forgings in which *welds are necessary.* In fact, in this connection it may not be out of place to say that axles for cars of the class with which the writer has had to do, were always from hand forgings in the black because drop-forging facilities were not available such as would afford drop-forgings in one piece. It would be far less expensive to employ two-piece drop-forgings and in nearly every instance they would serve the purpose, but no designer can afford to risk his reputation on a weld in an axle.

The time is now at hand when drop forgings of axles may be had, both in high-grade carbon and steel, as well as in alloy steels, free from welds and of grades of materials, as given in the tables Nos. I, II, III, IV, and V. Makers will, of course, differ in the matter of grades of material best to employ, nor does this article include any attempt to influence makers to use any special grade of steel, for this or any other purpose.

ACID OPEN HEARTH STEEL

Chemical Composition	Grade Special	Number I. Per cent. Average
Carbon by combustion		.40
Silicon		
Sulphur	Conforming	.019
Phosphorus	to the	.022
Manganese	carbon contained	.50

Physical Properties Considering Composition

Ultimate tensile strength in	Pounds per	85,000
Elastic limit in	square inch	60,000
Elongation in 2 inches	Per	24
Reduction of area at yield point	cent.	64
Diameter of test proof		Notched

Used for all parts not to be hardened in places where steel castings might be strong enough. If case-hardening is desired reduce the carbon to .20 per cent. or less.

NICKEL-STEEL

Chemical Composition	Grade Special	Number II. Per cent. Average
Carbon by combustion		.21
Silicon		.20
Sulphur	Conforming	.026
Phosphorus	to the	.025
Manganese	carbon	.35
Nickel	contained	3.5

Physical Properties Considering Composition

Ultimate tensile strength in	Pounds per	90,000
Elastic limit in	square inch	65,000
Elongation in 2 inches	Per	24
Reduction of area at yield point		56
Diameter of test proof		¾-inch

Used for parts of moderate responsibility of irregular shapes, to be forged, but not to be hardened. May be oil tempered and annealed.

NICKEL-CHROME STEEL

Chemical Composition	Grade Mild	Number III. Per cent. Average
Carbon by combustion		.20
Silicon		.20
Sulphur	Confining	.006
Phosphorus	to the	.017
Manganese	carbon	.35
Nickel	contained	4.25
Chromium		1.69

Physical Properties Considering Composition

Ultimate tensile strength in	Pounds per	150,000
Elastic limit in	square inch	137,000
Elongation in 2 inches	Per	8½
Reduction of area at yield point		½
Diameter of test proof		

Used for transmission gears, to be case-hardened. Suitable for other parts, to be forged.

NICKEL-CHROME STEEL

Chemical Composition	Grade Medium	Number IV. Per cent. Average
Carbon by combustion		.25
Silicon		.12
Sulphur	Conforming	.012
Phosphorus	to the	.013
Manganese	carbon	.73
Nickel	contained	2.40
Chromium		1.53

Physical Properties Considering Composition

Ultimate tensile strength in	Pounds per	154,000
Elastic limit in	square inch	133,000
Elongation in 2 inches	Per	11
Reduction of area at yield point	cent.	29
Diameter of test proof		¾

Used for frank shafts, distance rods, differential shafts, cardan shafts and other parts of great responsibility, to be oil tempered and annealed.

NICKEL CHROME STEEL

Chemical Composition	Grade High	Number V. Per cent. Average
Carbon by combustion		.40
Silicon		.20
Sulphur	Conforming	.014
Phosphorus	to the	.012
Manganese	carbon	.85
Nickel	contained	2.40
Chromium		1.80

Physical Properties Considering Composition

Ultimate tensile strength in	Pounds per	180,000
Elastic limit in	square inch	162,000
Elongation in 2 inches	Per	8
Reduction of area at yield point	cent.	23
Diameter of test proof		¾

Used for axles, distance rods, gear spindles, differential shafts, and other parts, subjected to great stresses, shock and severe usage.

A good open hearth steel as given in Table I is about the best grade of carbon steel that can be had for drop-forging work, but it must not be forged at high heats, nor must forging be discontinued before the temperature falls away to a suitably low temperature. In view of the fact that axles are, or should be, case hardened, the carbon component should not exceed .30 in any case, while .20 carbon would serve the purpose very well indeed. Axles of this grade of carbon steel will serve a very useful purpose, provided the design is suitable in view of the responsibility of the service. It is plain, to be sure, that a carbon steel axle will have to be much heavier than a nickel-steel axle, which, in turn, must be much heavier than a nickel-chrome-steel axle, but even an increase in weight and section will not result in carbon steel axles of the same great safety as that obtained by the use of nickel-chrome-steel. In the experience of the writer, which is quite extensive in the use of special steel products for motor cars, he has never seen a fractured nickel-chrome-steel member of a motor car, whereas, referring to carbon steel, he has seen hundreds of broken members. Nickel-chrome-

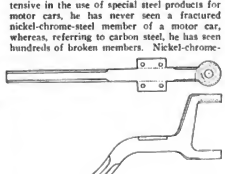


FIG. 2. 18-24 M. P. TOURING CAR. FRONT AXLE. FORGED IN THE BACK. .20 CARBON A. O. H. STEEL.

Tensile Strength, 85,000 lbs. per sq. in. Elastic Limit, 60,000 lbs. per sq. in. Elongation, 24% on 2 in. Production of area, 63%.

steel is not subject to sudden rupture, although it may be deformed under conditions of excessive stress.

Illustrative of this point is the fact that a nickel-chrome-steel front axle in a 90 motor-power Mercedes racing car was but slightly deformed during the late "Cuban Meet" as a result of the car having turned completely over and the full weight of the car landing on one end of the front axle. The axle was readily straightened out and is to-day doing good service, with far greater safety than could be expected from an absolutely new carbon steel axle of double the weight. Weight, next to safety, is the great matter of moment in motor cars, for weight makes tire bills high, while great weight introduces not only unendurable tire bills, but shock stresses vastly in excess of the desirable magnitude. From what has been said it is plain that axles must be:

a. Free from welds.
b. Of extra good material.
c. Forged at suitable heats.
d. Very carefully proportioned.
e. Drop-forged if the above conditions can be satisfied, but not otherwise.

The axle illustrations given herewith will serve to show something of the requirements, considering safety, the use of good material and methods of using the material consistent with the known qualities. In hand-forged axles it is generally safe to say that nickel-chrome-steel

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axles will cost about three times as much as ordinary carbon steel axles of the same shape and weight, but by drop-forging the nickel-chrome-steel axles, the cost may be materially reduced. Crank shafts are of even greater importance than axles, and much more difficult to drop-forge. Comparatively small crank shafts of carbon steel are now a regular product, but nickel-steel drop-forged crank shafts are quite rare, although the writer has seen a few of them.

In the "Simplex" products nickel-chrome-steel crank shafts prevail, but they are not drop-forged. Efforts are being made in that

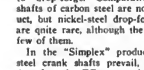


FIG. 3—30 H. P. TOURING CAR REAR AXLE. NICKEL-CHROME-STEEL FORGING

Oil tempered at 950 degrees C. Annealed at 550 degrees C. Tensile strength. 160,000 lbs. per sq. in., Elastic limit, 133,000 lbs. per sq. in. Elongation, 10 in 2 in. Reduction of area, 28 %.

direction, and it is fair to expect that in the course of events drop-forged crank shafts of nickel-chrome-steel will be obtainable. Cutting crank shafts from the solid of this material is not a low-priced undertaking, nor will ears of the "Simplex" quality be sold at popular prices for some years to come; certainly not until more is known about drop-forging alloy steels.

It is not believed that high-grade, powerful motor cars will have crank shafts of anything but nickel-chrome-steel in the future, so that to discuss carbon steel drop-forged crank shafts is out of place in this article unless perchance the failure to elaborate upon their qualities is an indication of *"what not to do."*

Transmission gears were long a source of much contention, and even at this late day the various designers are wont to wrangle about the material. It is not believed that the discussion is kept up on account of the question of quality as it is a matter of cost. It is useless to deny that nickel-chrome-steel gears are as low-priced as carbon steel gears, nor is it worth while to try to prove that nickel steel gears will serve the purpose. The writer knows of what one might call a museum full of nickel-steel gears that could not be used for the reason that they would not stand hardening. Not that one might not be able to harden a nickel-steel gear, but one cannot do the operation on a wholesale basis and feel any way certain about the result.

Carbon steel gears, if of high or even medium carbon, will not serve the purpose, while, on the other hand, low carbon steel gears are not strong. The result is that for thoroughly good transmission gears nickel-chrome-steel is about the only metal worthy of a moment's serious

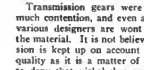


FIG. 4—PHYSICAL PROPERTIES 40 MOTORPOWER CRANK-SHAFT

Tensile strength, 160,000 lbs. per sq. in. Elastic limit, 125,000 lbs. per sq. in. Elongation, 16 in 2 in. Reduction of area, 23%. Hydraulic pressing using nickel-chrome-steel oil tempered to 950 degrees C., annealed to 550 degrees C.

consideration. Drop-forging is not at all out of the question in this work, for the reason that the shapes are very simple and the section uniform. In the matter of heating, however, great care should—in fact, *must*—be exercised else nickel-chrome-steel for gear will be spoiled in the process.

The illustrations of gears here given will serve as an idea of the allowable dimensions for gears of both carbon and "alloy" steel; the illustrations showing the finished sizes. In laying out gear blanks with a view to drop forgings it must be borne in mind that at least 7½ degrees draft must be provided, while some allow as much as 10 degrees. In any case, drop-forging blanks for gears should be designed for *finish all over*; otherwise in hardening the gear will warp.

In further relation to this matter of gears it is important that the process of hardening be conducted with great care and in a manner consistent with the qualities of the material employed. It is believed that nickel-chrome steel, as given in Table IV, will serve the purpose extremely well, although some foreign makers use alloy steel with as little as 0.60 per cent. chromium for the gears. Certainly the low chromium stock is soft and more readily forged, but the hardening process, while conducted at about the same temperature, will take a greater length of time.

In any case, assuming it is desired to case-harden the gears, they should be bone-packed with care and slowly brought up to a temperature approximating 900 degrees C.; after holding this temperature for from two hours upwards—depending upon quality—the gears should be oil quenched—use cotton-seed oil. Having thus fixed a hard armor, probably 1-32 of an inch thick, the next process will be that in which a soft core of great strength and toughness may be established, which to do place the gears in a cold furnace and slowly raise the temperature to approximately 570 degrees C., and again quench in oil. This process will not destroy the armor, but it will soften the core. In case it is desired to oil temper the gears, but not have a hard surface, proceed as above, excepting the bone-packing process.

Connecting rods may be drop-forged of either nickel-chrome or carbon steel, and in all probability will serve the purpose in either metal excepting that the nickel-chrome connecting rod may be lighter, thus making it pos-



FIG. 5—TRANSMISSION GEAR SHAFT NICKEL-CHROME STEEL FORGING SHOWING FRENCH PRACTICE

sible to reduce the weight of the moving mass which to a very considerable extent will benefit the crank shaft, which, for equal safety, may be lighter on that account. Brake drums of a special grade of nickel-chrome steel carrying something like 12 per cent. of manganese, which material, to be rendered hard, must be heated to 900 degrees C. and water quenched. The physical properties of this material will average as follows:

Tensile strength..... 135,000 lbs. per sq. in.
Elastic limit ..... 50,000 " " " "
Elongation..... 45 per cent. in 3.9 in.

The strength of this material is ample for the intended purpose, while, on the other hand, its lasting qualities are extraordinary for the reason that friction and heat do not affect its surfaces to any noticeable extent. This material fully illustrates the fact that great strength is not all that is needed in motor cars; indeed, to say that materials should be appropriate is far from saying that high-priced alloy steel should be used profusely, for, in all truth, there are members by the score in motor cars in which to use nickel-chrome-steel is to go off on a tangent.

Steering knuckles and their arms of drop-forged nickel-chrome-steel are very desirable, as are also steering-post arms, hand levers for brakes, and, in fact, all members used to control the speed and direction of cars. On the other hand, there are a variety of small levers used in conjunction with carburetors, magnetos, governors, timers and such other auxiliaries, the strength of which will be ample if they happen to be of even mild Bessemer steel, but they should be drop-forged to insure uniformity in appearance that they may be light, graceful and withal *low in point of cost*. It is in just these pieces that a considerable amount of the first cost of a car might be represented without in any way enhancing the value of the finished product, for, as may be well understood, a hand-forged lever, particularly if it is small and gracefully fashioned, will be very costly in dollars per pound by the time it is reduced to the shape and finish of a drop-forging, whereas a drop-forging might cost as much as sixteen cents.

The hand-forging, if of good steel, may be burned during the forging process, and in the end be of inferior quality on that account, while, on the other hand, the drop-forging, if worked at a low heat, will be uniform in quality and capable of doing the work for which it may be provided. Side frames, to be satisfactory, should be of "specification" flange steel, or of nickel-chrome-steel, unless, indeed, they be

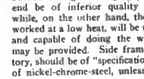


FIG. 6—"DIXIE CLUTCH SHAFT." NICKEL-CHROME-STEEL FORGING

Required to transmit 150 horsepower at 800 revolutions per minute. Oil tempered at 900 degrees C., and thereafter annealed to 570 degrees C. Tensile strength, 154,000 pounds per sq. in. Elastic limit, 118,000 lbs. per square in. Elongation, 12% in 3 in. Reduction, 25%.

rolled from spring steel, as some side frames are.

In racing-car work the writer has employed nickel-chrome-steel 3-32 of an inch thick for side-frame members, and in the last Bennett race one car finished without any mishap at all, in which the side-frame members were of this thickness, thus showing that foreign designers are wont to employ a minimum quantity of extra quality material.

In conclusion, and in relation to drop-forgings, it may be well to point out one or two purely commercial features that are on that account of grave importance, as, for illustration, the time required in which to procure drop-forgings is something of a problem.

The actual time taken for drop-forgings, including the time to produce the dies, was found by the writer to be as follows:

possible to say that an urgent appeal for results was sent out at least every ten days, so that it is believed the time taken was the least possible.

In relation to the question of cost of drop-forgings there is much to be said in their favor. In the first place, if steel castings are used instead, upwards of 33 per cent. of all steel cast-

TIME FACTOR

NAME OF PART	DESCRIPTION	DAYS
Spring Hangers	Small and simple	105
Universal rods	I section, plain	85
Spring Links	Very simple	85
Starting crank	Plain elliptic section	62
Connecting rod	75 M. P., I section	84
Differential housing	Heavy but plain	100
Steering knuckles	Considerable die work	146
Brake bands	" " "	92
Bevel gears	Very simple dies	78
Hand levers	Much die work	140
Clutch shaft	Considerable die work	112
Sprocket hubs	Fairly simple	94
Valve caps	Very simple	58
Sprocket wheels	Simple die work	48
Brake levers	Plain work	60
Cam shafts	" "	60
Adjustable couplings	" "	55

In every case the work was pushed as much as possible; in fact, in this connection it is

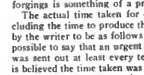


FIG. 8—NICKEL-CHROME-STEEL BEVEL GEAR ILLUSTRATING FRENCH PRACTICE

ings will develop flaws the magnitude of which will necessitate their condemnation with every chance of flaw developments after some machining is done upon them.

In any case, steel castings are not, as might be supposed, low-priced. Indeed, in this connection it is almost a certainty that, counting the cost of dies and considering no more than a one hundred lot of cars, drop-forgings will be no more expensive, all things considered. Nor can steel castings be procured as quickly as one might think, not nearly so expeditiously, in fact, as drop-forgings may.

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Mechanical Briefs of 1906 Models

LOCOMOBILE, TYPE "H," 30-35 M. P.

LOCOMOBILE is a proprietary trade name for a capitally good car, so good indeed that it should be always written with a capital L. Two models will be produced during the coming year and while these two models are on the same lines as the previous productions, the details have been largely developed and greatly improved.

The 15-20 m.p. model is called type "E" and sells for $3,000. The 30-35 m.p. model is called type "H" and sells for $5,000. The bore and stroke on model E are 3¾x4½ inches, on model H 4½x5½ inches, and these will be the largest size models made by the company hereafter, these sizes having proven in the past to be the most popular.

At a first glance it might seem as if the abandonment of their old model "F" with its big 5x6 cylinders of 40-45 m.p. was a step backward. Indeed, it is not, because it is a step forward, the lower priced, lower powered and lighter weight cars of the coming year possessing a greater mechanical efficiency than heretofore, and notwithstanding that they are square form, the motor base is bolted directly to the frame. The cylinders are not yoked together as in previous practice, the pairs standing separately. The magneto has been somewhat changed in form and is described elsewhere in another article on the subject. The ignition points on the make and break sparker are now fitted with iridium, platinum having been found too soft a metal. The ignition plates are in the form of a taper plug, readily removable, and the ignition bus bar is now raised above the sparkers so as not to interfere with their dismounting. A new knife-bladed switch is used to throw the cylinders either in or out of the circuit. The motor speed is controlled by the usual form of centrifugal governor working on the throttle holding the motor at a minimum of 150 r.p.m., the earbureter itself having a new throttle, and it is now possible to flood the carburetor from the seat. A new rod on the governor is an ingenious thing. It is now made in two pieces, which abut, instead of a single piece as heretofore, which was apt to spring out of line. The balance piston throttle is remarkably sensitive. The hand throttle on the steering wheel being adjustable, with means for tightening the belt. New push pedals are provided, and a peculiarity of the emergency brake is that to use it it has to be pushed forward instead of pulled backward, as is usual. A double universal joint is used between the clutch and the flywheel, the face of the clutch being very much wider than heretofore. Large, wide brakes are used on the differential of the metal-to-metal type, cast iron against steel. The wheel brakes are very large and they are of the internal type, the drum being bolted very rigidly to each spoke of the wheel. On the large size car the rear springs are on the outside of the frame, and regarding the axles it is said that a Locomobile axle was never known to have been broken. Both axles are of drop-forged steel of I section, hand welded in the center.

A sight-feed oiler is mounted on the dashboard, operated by a belt from the motor, the oil being pumped to the top of the sight-feed tank, flowing from there by gravity. The crank case is divided into two compartments fitted with an overflow standpipe for the oil. An emergency hand pump for oiling is



LOCOMOBILE. TYPE H. 30-35 M. P. $5,000

rated at a lower motorpower they will develop the same amount of speed as the bigger types heretofore produced. It is safe to say that this notable tendency towards smaller powers, but with greater efficiency, will be the rule and not the exception in high-grade cars during the coming season.

The Locomobile Company may be said to be among the pioneers of four-cylinder motorcar constructors in this country. In 1902 they produced a car which is still in use in Bridgeport, having four vertical cylinders and an automatic float-feed carburetor, the same type of gear box that they still use, a direct drive on the high gear and a steel-channeled tapered frame with a sub-frame, and constructor Riker was one of the first of American makers to adopt the make and break ignition system.

The cylinders of the motor are cast in pairs with integral water jackets and heads. The crank case, which is made of manganese bronze casting, is in two parts, consisting of an upper and a lower part, which forms a pan. The upper part, which carries lugs for the support of the motor, has the cylinders bolted to it and also carries the shaft bearing. The lower part of the crank case, which is used as a splash box, is of aluminum. There is no subframe attached to the frame, for by means of these lugs, which are cast in hollow, open sets the compression of a spring against the governor which operates in opening or closing the throttle, a small pinch bind collar with a set screw setting the tension of this spring at any point desired. The spark is advanced to about a 3/8-inch lead by sliding the ignition cam shaft to the necessary position.

An ingenious system is adopted regarding the time of opening and closing the valves. It will be clearly understood when it is said that they overlap each other so that the exhaust valve is held open a little longer than usual while the inlet valve is also opened, so that the inrushing gas acts as a scavenger while the outlet valve is still open, thus producing a clean mixture. Regarding the extravagance of this system, the cost of it, it is claimed, is almost negligible.

A Whitlock cellular cooler and tank is used, but the cooler is not rigidly fastened at the top, it having a free suspension, so that the movement of the frame will not cramp it and cause it to leak. A centrifugal pump is used for circulation; the water coming in from the pump divides itself and sinks to the bottom of the water jacket through standpipes and then rises upward and outward. A seven bladed, ball-bearing aluminum vane fan is now driven by an endless stitched belt, an improvement because it cannot come apart, the belt bearing arranged fitted to the dash in case of need. The control of the car is very simple, the spark and throttle levers being on opposite sides of a notched quadrant located on top of the wheel, but these quadrants do not move with the wheel, so that the proper position is always at hand irrespective of the position of the steering wheel. The spark lever advances forward or pulls backward the inlet cam shaft which has already been mentioned. A small accelerator pedal throws out the governor and opens out the throttle. Application of the emergency brake throws out the clutch.

The cars are upholstered in plain black leather, a peculiarity of the upholstering being that the leather is put on perfectly plain, not tufted or buttoned, the makers claiming that this provides a cleaner car for road use, gives a broader bearing surface for the passengers and much more comfortable riding.

It might be here mentioned that the same features which are individual in the regular stock Locomobiles—both the 15-20 motorpower type "E," and the 30-35 motorpower type "H" which the above illustration shows—are in the Locomobile racer of Dr. Thomas's which Tracy drove into a place in the Vanderbilt cup race. The difference between the racer and the stock cars is, of course, merely of size of parts, cylinders, etc.

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POPE-HARTFORD

THE new four-cylinder Pope-Hartford Model F, which sells at $2,500, is remarkable not only for its quality at the price, but for its quietness in running and its speed and hill-climbing qualities. Its makers, the Pope Manufacturing Company, have never had the reputation of making extraordinary claims for their product; hence their new model F is of more than passing interest.

A four-cylinder vertical water-cooled motor is used with all gears encased, the cylinders being cast in pairs with integral heads and water jackets, developing under brake test 28-30 m.p. The valves, located in the head, are all mechanically operated and interchangeable. Cylinders and pistons are made of special stock and ground to a mirror finish, thus insuring perfect compression. Crank shafts are of special treated nickel steel with liberal bearings. The crank case is supplied with two large hand holes on the right hand side of the case through which every bearing on the crank shaft is accessible.

Ignition is by jump spark, combined commutator and secondary distributor located between the second and third cylinders, and driven from the cam shaft through a pair of spiral gears, with a single coil controlled by a lever located on top of the steering wheel, but not revolving with the wheel.

The lubrication of the engine bearings and cylinders is from a special oiler located on the dash, driven by a belt from the cam shaft. The bearings of the transmission are provided with ring oilers running in individual wells at the ends of the shaft. All parts of the car not lubricated in this way or by splash are provided with oil or grease cups wherever necessary.

The transmission is of the sliding gear type having three speeds ahead and reverse and is enclosed in an aluminum case with an aluminum cover which is readily removed for inspection purposes. The gears are all made of special steel hardened. The countershaft has three large bearings substantially bolted into the case and without any opening through the ends of the case. All bearings are of special grade phosphor bronze and the gears and bearings, with the exception of the front and rear main bearings, are immersed in oil, the front and rear bearings being lubricated from two oil wells in the bearing case, the oil being carried by a ring to the shaft. The gears shift by a hand lever located on the right hand side of the seat, operating through a sector and pinions, a rack on the inside of the gear case being directly connected with the sliding gears, the thrust at this point being taken up by a substantial ball thrust bearing.

The carburetor is of special design, very flexible and efficient in running from 150 r.p.m. to 1,600 r.p.m. and unrivaled in economy of fuel consumption. Controlling levers for ignition and throttle are located on top of the steering wheel engaging with a single sector arranged so as not to revolve with the steering wheel. All gears changed by one lever located within easy access of the driver.

A compensating joint is located between the motor and transmission, and the drive from the transmission is through a longitudinal or propeller shaft having universal joints at either end through a pinion and bevel gear to the rear axle. These joints are so arranged that all bearing surfaces are thoroughly lubricated at all times. All parts of the joints and shafts are made of special high carbon steel with liberal pinions which work in removable phosphor bronze bearings.

The front axle is a solid forging of special steel having forked ends to receive the pivots.



FOUR-CYLINDER POPE-HARTFORD

The axle is of exceptional strength and extremely graceful in design.

The bevel gears driving the rear axle consist of a pinion meshing with a gear, both gear and pinion being made from special steel, the pinion shaft being made integral with the pinion and runs in two Timken roller bearings. The rear axles proper or driving shafts have squared ends which fit in square holes in the differential gears, insuring strong and durable construction. The shafts are securely keyed and locked at their outer ends in the wheel hubs and do not carry the weight of the car but are solely power transmitters, the ease and outer tube of the axle carrying the weight of the car. The thrust of the bevel driving gear is taken up by a large ball thrust bearing suitably backed up by hardened steel washers and supported by the main bearing of the case.

The steering mechanism consists of a worm and sector enclosed in a case packed with graphite grease and is strictly irreversible. Steering joints are provided with spring buffers to relieve road shocks.

The car is provided with two sets of brakes, one an external clamping band brake faced with camel's hair belting and acting on a drum attached to transmission shaft directly at the rear of the transmission case. The other set consists of two internal band brakes which are also faced with camel's hair belting and act in drums which are bolted to each rear wheel hub. The brakes are all of ample proportion and of strong and powerful construction, either one of them being capable of locking the wheels with a very slight pressure on the foot levers.

The frame is composed of armored ash side pieces 1 5-16 by 4 inches at the center. The armor consists of steel plates 3-16-inch thick, securely bolted to the side pieces after all the riveting, which is done hot, is completed. The sub-frame which carries the motor is made of channel steel securely riveted to steel cross members at either end.

The body is of new and graceful design, seating five people, with non-removable dust-proof tonneau with double side entrance especially easy of access.

The dash is of curved sheet steel reinforced with wood, finished in natural color and surmounted by a brass rail.

The wheel base is 98 inches and the tread 56 inches, the wheels being 32 x 4 front and rear, with ball bearings of large dimensions.

The gasoline capacity is 15 gallons, with a water supply of 5 gallons, the complete equipment including a full set of lamps, horn, tools and floor mats.

While the Pope Manufacturing Company are also the makers of another famous motor-car than the Pope-Hartford, known as the Pope-Toledo, the car described in the foregoing is not to be confounded in any way with the later-named car, and the mechanical details of these two motor cars differ widely. There is, however, a slight similarity in outward appearance, but no more than exists between cars of other makes.



EXHAUST SIDE — POPE-HARTFORD MOTOR — IGNITION SIDE

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Mechanical Briefs of 1906 Models

PEERLESS

PEERLESS, as a motor-car name, stands for quality rather than for quantity. From the earliest of pioneer days it has been the policy of the makers to see how well they could build each individual car rather than how many they could produce.

The motor is of the vertical four-cylinder, water-cooled type, with the cylinders cast in pairs. The intake and exhaust valves are located in off-set ports on either side of the motor, and are mechanically operated by half-time shafts. Intake, exhaust valves, and springs are all interchangeable.

The cylinders are of a special material, carefully bored out, reamed, then lapped or polished, so that the cylinders are smooth and perfect. The advantage is good compression, even when the motor is new; it does not have to be worn in service before developing its best power and efficiency. Even the head of the combustion chamber is finished so that no fin or projecting point can become unduly heated or collect carbon deposits which cause premature ignition and consequent injury of the motor. This also gives the same number of cubic inches in each cylinder.

The pistons and rings, connecting rods and wrist pins, are all carefully machined, not only to insure a perfect fit, but so that they will weigh exactly alike. Therefore, the motor is evenly balanced and runs almost without vibration and with a minimum of wear.

Lubrication of the pistons is effected through tubes running to cylinders from the forced feed lubricator.

As an example of the accessibility of the motor: The lower half of the crank case is divided into two parts. The lower section is so designed as to be readily removable without taking the motor from the frame or removing the dust pan or any part of the car. By simply removing a number of bolts this lower part of the crank case can be dropped, exposing the crank shaft, connecting rods, and bearings for inspection and repairs. Grooves are cut in this lower section running toward a lower central point or pocket tapped out to receive a plug. This plug can be removed in a minute's time, and with it all foreign matter and dirty oil. The crank case can then be flushed and refilled, and the owner is satisfied that his crank case has clean oil and that his lubrication is properly taken care of.

The crank shaft is of solid drop forging, specially hardened and ground to exact size. The bearings, three in number, are unusually large and are of a special white bronze metal, which affords the very best wearing qualities.

Every gear of the motor is housed in a separate oil-tight compartment of the crank case and runs in oil. Even the water pump gear is housed and likewise the governor, which is carried in the half-time gear wheel and only its working arm protrudes through the case. This insures an almost noiseless motor and one where wear of working parts is reduced to the lowest possible factor. Oiling of the crank-shaft bearings and wrist pins, cam shafts and cams, is by splash from the dip of the connecting rods into the oil in the crank case.

The float feed, heated by water jacket carbureter, is of new design, automatic in its action, so as to provide a suitable mixture for varying speeds of the motor. A throttle operating a butterfly valve in connection with the inlet pipe is operated automatically by the governor, to prevent the engine from racing when the clutch is thrown out.

Ignition is by batteries and jump spark. The commutator is located on the right-hand side of the motor, just back of the rear cylinder, and driven by bevel gears from the half-time shaft. Instead of the wipe contact by brush, a roller running in oil is used so as to eliminate wear. The commutator being set at an angle of about sixty degrees insures constant presence of oil, whereas if set vertical the oil is liable to work out of the commutator through the bearing.

Water circulation is by gear-driven pump housed and running in oil.

The radiator is constructed of flat copper tubes, arranged laterally and held in position by perforated metal disks. These tubes communicate with the tank, which is a solid casting, including the side support or brackets by



PEERLESS, MODEL 14, 30 M. P., $3,750

which the radiator is fastened to the frame. There is, therefore, no weak point to become loosened by vibration or wear so that it will leak and cause trouble. The heated water comes from the top of the cylinders into a header pipe, which distributes it to the copper tubes, through which it passes downward to the tank beneath. The tubes are of such size and arrangement as to afford the most effective cooling surface for the heated water. A gear driven centrifugal pump (the gear being housed in the crank case and running in oil) forces the cold water of the tank into the water jackets of the cylinders.

The radiator fan is carried on a bracket attached to the engine base, and is driven by a one-inch flat belt. The fan pulley runs on a ball bearing set in an eccentric so that any slack of the belt can be readily taken up.

Two sets of powerful brakes apply directly to the rear wheels, holding securely in either direction. The foot brakes operate external clutch bands that lock the drums on the rear wheels. These bands are fiber-lined and fitted with an ingenious spring device that holds them away from the drum when not engaged, thus preventing heating and wear. The foot brake does not disengage the clutch, but acts independently of it, a feature which will be appreciated by the operators who have tried to start a car on an incline. It also enables an experienced operator to use the motor running against its compression as a brake in either direction, aiding it by means of application of foot brake.

The emergency hand brake is of powerful leverage and applies bronze expanding brakes internally to the rear wheel drums. This brake automatically disengages the clutch.

Both brakes are operated through equalizers that engage evenly on either wheel without skidding or side slip. The cast-steel brake drums are unusually large and the brakes are wide and substantially built.

The clutch is of positive internal expanding type, the clutch pedal being adjustable, and is operated by a foot pedal with long leverage, so that very little pressure is required to disengage it. The advantages of the expanding type are many: first, the light weight and lack of inertia, or flywheel effect, which in other types prevents a quiet and quick shifting of gears; second, the smooth action with which the clutch takes hold when engaged, so that the occupants of the car will not notice any jolt or jar, such as would be experienced when a cone-clutch, for example, bites and grips. The expanding type distributes its wear evenly and takes it up automatically. It can be used thousands of miles without adjustment, although means are provided for adjusting without taking out. There is no end thrust on the shaft. The clutch can be easily dismounted without disturbing any other part.

One of the novel features of the car is an ingenious device whereby the distance from the clutch pedal to the front seat may be varied at will, so as to accommodate either a tall or a short person.

The transmission is of the sliding gear type, four speeds forward and a reverse. The transmission gears are all operated by a single lever located conveniently to the driver's right hand. The gears themselves, shifting yokes, and levers and all wearing parts are housed and run in oil. The square shaft on which gears slide in effecting speed changes is hardened and ground, so as to be almost frictionless. Imported ball bearings of large diameter are used in the speed case, both in the main shaft and countershaft. While these ball bearings require very little oil, an ingenious arrange-



THE BRAKE



THE GEAR CASE

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THE THREE-POINT SUSPENSION

ment has been provided to take the necessary oil from the gear case. The casing is of aluminum, made in halves, with a large-sized handhold on top, which can be easily removed for inspection of the gears and for cleaning the case of dirty oil.

Between the motor and the transmission case is a double universal joint of ample length, so that in case it becomes necessary to take out either motor or speed gear, this joint, which is easily removable, provides for sufficient clearance so that no other part of the mechanism need be disturbed.

The power is transmitted to the rear axle by means of a flexible shaft, which is made without a screw or nut to wear or become loosened. It is very easily detached. A universal joint at either end is housed in a dust and water-proof case, filled with lubricating grease.

Distance rods run from the frame to the rear axle on either side. These rods are adjustable by means of a turnbuckle so that the axle can be easily lined up, and the pulling strain is through these distance rods and not through the springs, which are used solely for suspension.

The weight of the car and its load is carried on tubes, which are of large size and heavy gauge, and extending into a brazed cast-iron differential case, and further strengthened by a webbed collar, brazed to the tube and bolted to the end of the differential casting. A ¾-inch truss rod runs from the center of the differential case to a boss on the under side of the spring saddle on either side, with a nut on each side of the boss to compensate for the different strains. The differential case is of cast-iron and is covered with aluminum casing, which is easily removable. Spring saddles are brazed to the axle tube.

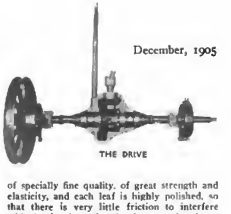
Bevel gears are essential at some point in every motor-in-front car. By the Peerless system of placing them in the rear axle, in combination with the differential, they eliminate countershafts, chains, and sprockets with their attendant troubles. The bevel gears are both large surface and of the proper pitch for strength of teeth, for wearing quality, and for running quietly. They are hardened and run in grease on adjustable ball bearings, in a dust-proof case.

On each side of the driving gears are universal joints, which take up all strains on the axle and absolutely prevent any binding on the gears, because they are always in perfect alignment. These universal joints in the live axle make it possible to have an arched-axle construction, which is much stronger than any other, and also permit dishing the rear wheels two degrees the same as the front wheels. The wheels revolve on the stationary axle on adjustable ball bearings, consequently there is no load to carry on any moving part of the rear axle at any point. This system of drive, which has always been a distinctive feature of Peerless cars, it is claimed, delivers a larger proportion of the motorpower to the rear wheels than any other.

The front axle is a solid drop forging of "I" beam design. The center of it is the lowest point of the car.

The frame is of pressed cold-rolled steel of truss pattern. The side members are perfectly straight, and the length over all, including spring hangers, is 148".

Semi-elliptic springs are used. The steel is



THE DRIVE

of specially fine quality, of great strength and elasticity, and each leaf is highly polished, so that there is very little friction to interfere with the freedom of action between the plates. The two rear side springs are attached in front to the frame, and in the rear to a platform spring, bolted to the center of the rear cross member of the frame, thus making a three-point spring suspension. Both front and rear springs are unusually long, semi-elliptic in shape, and the rear springs are offset from the frame so as to carry the load as near the hubs as possible, minimizing the strain on the axles. Ample clearance is allowed, so as to prevent any possibility of the frame striking either axle.

Thirty-four-inch wheels of the artillery type are used, with dished spokes. This spoke construction best withstands the side strains when turning corners or skidding. Special imported ball bearings, which do not require adjustment, are used in the hubs. Four-inch clincher tires are used on both front and rear wheels. The wheel base is 107 inches and the tread standard.

Bodies are of metal, with double side entrance—King of Belgium type. The body retains the same graceful lines as last year, but has a somewhat wider and roomier tonneau. The standard color is Peerless green, a dark, rich shade already well known. The striping is black with fine gold line.

MAXWELL TRUCK

THE Maxwell-Briscoe Motor Company have brought out a new 18 m.p. truck, upon which the designers of the company have been working for the past year.

The truck has had a considerable amount of inspection and admiration by technical men and others interested in commercial vehicles.

The motor is of the double opposed type, 5 inches x 5 inches, and is rated at 18 m.p. at 1,000 revolutions per minute. Both inlet and exhaust valves are mechanically operated. A special feature of the motor is that by loosening six bolts, the valve motion case can be lifted from the case on which it rests, thus rendering accessible the connecting rods and the wrist pin. The crank and transmission case is hung at three points, following the principle of Maxwell three-point suspension. The motor and transmission case are of one aluminum casting, insuring a rigid construction and making it impossible for the gears or shaft to get out of alignment.

The transmission is of the sliding gear type, employing three speeds forward, and one reverse, with a maximum speed of eighteen miles per hour. All gears are drop-forgings, after which they are cut out and hardened.

The bearings in the motor case are bronze shelled, babbit lined. Those in the transmission case are of the plain babbited construction. A feature in connection with the motor is that any wear occurring on the bearings can be taken up and the bearings adjusted without removing either the transmission or the motor-case cover, the adjustment being controlled by set screws located at the bottom of the case.

The adjustment of bearings has heretofore been regarded as a laborious undertaking, but by this arrangement it is possible to readily compensate for wear, making it a particularly desirable acquisition in a truck.

The ignition is by jump-spark, the current being furnished by two sets of dry batteries.

The rear axle and drive shaft have been thoroughly tested out and have proven their efficiency on the touring cars and tourabouts manufactured by the same company, though the axles on the truck are made proportionately heavier.

The drive shaft employs two universal joints, having ample facilities for holding grease. The rear axle is provided with the Hyatt roller bearing, no balls being used in the construction.

The side thrust inherent with bevel-gear construction is taken up by a blank roller of the same size as the drive pinion. This being fitted against the smooth bevel surface of drive gear holds the latter up to its work, making it impossible for it to get out of alignment.

All metal parts are positively oiled by sight-feed compression oilers.

The clutch is of the multiple disk type, these being held in engagement by a powerful spring. The construction of this clutch makes it impossible to strain the mechanism by too sudden engagement.

The gears are also provided with a suitable lock, making stripping due to carelessness of operation impossible.

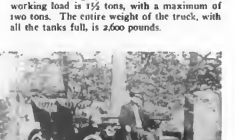
The body is of wood provided with suitable sides. The springs have been carefully designed and are amply proportioned. The wheels are 32x4 rear and 32x3½ front, Firestone solid tires being used. The floor space is 10½ feet long by 6 feet wide. The normal working load is 1½ tons, with a maximum of two tons. The entire weight of the truck, with all the tanks full, is 2,600 pounds.



REAR VIEW



THREE-QUARTER VIEW



CARRYING A TOURING CAR

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Mechanical Briefs of 1906 Models

RAINIER MODEL "B"

UP to the year of 1905, the Rainier Company will be remembered as having been principally identified with the electric vehicle business, and their large electric trucks and wagons are to-day in use in all the principal cities throughout the country.

In the spring of 1905 the Model "A" Rainier cylinder-fired gasoline car, 22-28 m.p., was first produced and at once created a sensation, not only on account of its evident mechanical perfections, but also because of the unique guarantee which accompanied it. The makers absolutely agreed to replace any part of the chassis which gave out, from any reason whatsoever, barring accident, within one year from date of delivery. These replacements were not confined to defective parts, but included any part which would wear out, thereby affording a practical insurance policy as to the lasting qualities of each part.

So successful have these ears proven, that in the fall of the year the Rainier Company decided to abandon the electric vehicle business altogether, and is now confining its energies, exclusively to the production of Rainier gasoline cars.

The 1906 model "B" Rainier is built on the same general lines as the model "A" which achieved such a signal success in 1905, but it must be regarded as a distinct development of the smaller car, in that the wheel base is increased to 104 inches, the motor to 30-35-m.p., 4½x5-inch bore and stroke, and the system of ignition, from storage batteries and jump spark, to make and break spark with Simms-Bosch low tension magneto. The entire mechanism of the ignition system, including all mechanical parts affecting the timing of the spark or movement of the spark point, is concentrated on the top of the cylinder and can be instantly removed in case of need. Instead of taking its time from cams on the distant valve cam shaft on the lower part of the motor, the motion of the motor is transmitted to the timing apparatus through steel gears enclosed in an aluminum case and running in oil.

Particular attention has been given to providing ample and hardened surfaces at any friction point likely to affect the timer. The magneto itself is carried on a boss on the motor base and is of the Simms-Bosch low-tension type. The valve gear is equally up to date. The cams are forged on the cam shaft and both cams and rollers are case-hardened. The cam shaft is driven from the main shaft, through hard bronze gears enclosed in an aluminum casing and running in oil. The centrifugal pump for water circulation is gear driven from the valve cam shaft. The belt-driven cooling fan is not attached to the radiator, but mounted on a shaft projecting from the forward cylinder, and runs on ball bearings. The main bearings on the motor are held in the upper half of the motor case, so that the lower case serves simply as an oil pan, which can be removed without disturbing any mechanism whatever. This means that the cranks and under side of the motor can be gotten out without dismounting the cylinders from the base.

A "Hill" oiler provides a positive feed to all bearings except the pistons, which are lubricated by a direct splash.

It will be easily seen from the above that particular attention has been given to making the motor and its accessories self-contained, so that it can be removed from the chassis by disconnecting only the exhaust, intake and water connections, thus leaving only the carbureter on the car and detached from the motor itself.

The valves are mechanically operated, inlet and exhaust being interchangeable. The carbureter is a simple float feed, requiring no adjustment, the advantage of which is that it is not subject to probable derangement as a result of inexperience. The exhaust leaves by two flattened tubes just back of the rear wheels and lays the dust raised by the tire traction.

The clutch is the cone type with leather face. A universal bearing joint is provided between the clutch and change gear. The change speed gear is of the sliding train type, with three speeds forward and reverse, with direct drive on the high gear. The squared shaft is forged in one piece with the gears bolted to flanges forged integrally with the shafts. All bolts are cotter-pinned. Gears are 50-carbon steel, oil hardened. The case is small and compact, made of aluminum, oil tight, and is provided with a hand-hole for examination and lubrication.

The propeller shaft is of oil-hardened 50-carbon steel. Universal joint forks are oil-hardened drop-forgings connected by case-hardened pins.

Next to the motor, the rear axle is the most interesting feature of this car. It offers all the usual form of advantages of the ordinary bevel-gear drive, with none of its disadvantages. The objection to the bevel-gear drive lies in the fact that with most constructions the rear-wheel hubs are keyed to the axle shafts running in bearings, of one form or another, supported within a tube which carries the spring blorks and body of vehicle, but supported by axle shafts. These shafts in turning transmit the motion of the motor to the wheels, while at the same time they are continually under the strain of carrying the load of the car. Examination of the Rainier axle will indicate immediately that these difficulties have been overcome, because the wheel hubs, instead of being keyed to the axle shafts, are carried on bearings *which are part of the tube itself*, so that the external tube—unassisted by the axle shaft—carries the entire load of the car. As a matter of fact, the live axle itself can be removed entirely, and the car will remain standing on its wheels and can be moved about. The axle shafts themselves are loose, squared into the differential on one end, and into the driving clutch on the outside of the wheel on the other end. These driving clutches might more properly be described as "dogs," locking into the outer end of the wheel hub. The wheel itself runs in ball bearings *on the outer tube*. The differential gear also runs on ball bearings.

There are two internal expansion brakes, phosphor bronze against steel, fully dust-protected. They operate on rear hubs through the emergency brake lever, holding positively either forward or backward. In addition, there is a foot-brake operating on the propeller shaft, phosphor bronze against steel.

The front axle is of "I" beam section with a bed of drop-forged nickel steel; the hubs are carried on ball bearings and the steering knuckles and pivots are oil-hardened, and are the reversed "Elliott" type of steering pivot, which has the advantage of having the load borne at the bottom instead of top of knuckle, which is of great assistance in lubrication.

The frame is of cold rolled pressed steel, with under-bonnet covering entire motor and transmission.

The wheels are 34x4-inch grade "A" second growth hickory, equipped with imported Continental tires, unless otherwise specified.

The bodies are made entirely of aluminum, trimmed in best hand-buffed leather, with large double side entrances, the doors having the usual snap catch, the handle of which when turned forward and horizontally, locks it fast. The rear seat is 52 inches wide between cushions, affording comfortable seating capacity for three persons, and there is ample space in the tonneau for two extra seats, if desired. A large locker is placed under the rear seat, with entrance from the front and rear. The dash is of concave pressed steel.

The equipment consists of two acetylene headlights, two sidelights, one rear light, one French horn, and full kit of tools. All bodies are ironed for tops.



THE NEW 1906 RAINIER; 30-35 MOTOR-POWER

SPECIFICATIONS—Model "B" Rainier

MOTOR—30-35 m.p., 4 cylinder, water cooled.

IGNITION—Sims-Bosch Magneto—make and break spark.

TRANSMISSION—Sliding train, 3 speeds forward and one reverse.

BEAR AXLE—Bevel gear drive, clutch driven hub. Ball bearings.

FRONT AXLE—I Beam section. Ball bearings.

FRAME—Cold rolled pressed steel, aluminum under bonnet.

WHEEL BASE—104 inches.

WHEELS—Imperial whalebone, grade A 2d growth hickory.

TIRES—Continental 34x4.

VALVES—Mechanically operated, interchangeable.

CARBURETER—Float feed, requiring no adjustment.

BRAKES—Two internal expansion, dust protected, on rear hubs, holding either forward or backward. Foot brake on propeller shaft. Both brakes bronze against steel.

BODY—Full aluminum, double side entrance.

EQUIPMENT—Head lights, side lights, rear light, horn.

Price, $4,000.

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NEW REOS

THE REO 'BUS

THE recent six-day motor-car economy test of the New York Motor Club brought to the front in a most conclusive fashion two new Reo cars, one an eight-motor-power Reo runabout, the other a new model sixteen motorpower Reo omnibus, which made its début on this occasion. Three special prizes were won by the omnibus and two by the runabout. The National trophy for the most economical showing per passenger was won by the 'bus, with a per capita rate for the six days of $2.93, carrying ten passengers 68.8 miles, and this cost including ferriages. Further details show the cost of travel by motor car to be about one-fourth of that by railroad. The average cost per passenger was $3.47, as against $14.53, the aggregate of round-trip railroad fares between New York City and Philadelphia, Albany and Southampton. The Moore trophy for the best record for economy, with tire charges included, also went to the 'bus with an average cost per mile of $.429. The Morgan trophy for the minimum quantity of gasoline consumed per passenger was also won by the 'bus with a per capita cost for gasoline of $1.60. The McMurtry trophy for the least ignition trouble was won by the Reo runabout, which had a clean score. The same car also won the gold medal for the best showing in classes A and V for cars selling up to $1,500. The per capita cost for four passengers carried was $3.38. In the classes C and D for cars selling from $1,500 to $3,500, the best showing was made by the Reo 'bus, but the conditions of the contest prevented the 'bus receiving a first-class prize in addition to the National trophy.

The Reo omnibus has a wheel-base of 90 inches, a tread of 55 inches and is fitted with 30-inch wheels, carrying four-inch pneumatic tires. The power plant consists of a pair of horizontal, double-opposed motors, having 4¾ x 6-inch cylinders set parallel with the length of the car, and using a planetary transmission with a multiple disc, high-speed clutch, which it is known, permits what might be termed a graduated, slipping, slow drive on the high speed. A noticeable peculiarity of the construction is that the driver sits well forward with nothing in front of him but the dashboard and the radiator, while the gasoline tank with 15 gallons capacity is under the driver's seat.

Allowing 18 inches of seating capacity per passenger, the car comfortably seats twelve passengers besides the driver, and its estimated weight is 7,700 pounds, while its cost complete is only $1,600. For accessibility sake the body panels are made removable on both sides of the body. When these and the doors are removed, free access is given to the transmission and the motor, so that the entire floor of the 'bus is of one-piece construction without any openings of any kind. Lazy-backs are provided for all the seats, and also cushions.

TWO NEW REOS

ANNOUNCEMENT is just received from the Reo Motor Car Company of their 1906 models which are now ready for immediate delivery are being distributed to the agencies.

A new model will be the five passenger 16 m.p. light touring car, with side door entrance and detachable tonneau. Only a few slight changes from the popular 1905 model were found desirable; one being an improved oiling device, which feeds directly and automatically without a valve, affording a positive and measured charge which proportions itself absolutely to the motor speed.

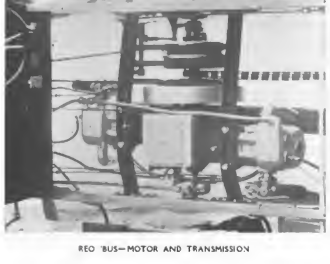
Another model, as shown in the illustration, is the new 8 m.p. Reo runabout with folding rear seat, which accommodates four passengers facing forward, the speed of which is 26 miles per hour.

Specifications, Reo runabout: Weight, 1,100 pounds; frame, angle steel; springs, front, ½ elliptic; rear, full elliptic; axles, tubular; roller bearings; wheels, wood, artillery; tires, standard equipment, 28x3 inches; motor, horizontal, non-vibrating, single cylinder; motor power, 8 m.p.; cooling system, water-jackets integral, tubular radiator; positive gear pump; valves, mechanically operated and protected; carbureter, R. E. Olds' latest patented design; clutch, special adjustable friction; ignition, jump-spark; current, dry battery, two sets; transmission, planetary, without internal gears; drive, direct, single chain, heavy roller; steering, wheel, dustproof gear; mileage capacity, 6 gallons; water capacity, 3½ gallons; wheel base, 78 inches; wheel gauge, 55 inches (standard wagon); brakes, 2 double acting, hub; speeds, 2 forward, one reverse.

Specifications, Reo 5 passenger touring car: Weight, 1,600 pounds, without tonneau 1,515 pounds; frame, pressed steel; springs, front ½ elliptic; rear, full elliptic; axles, tubular, roller bearings; wheels, wood, artillery; tires, standard equipment, 30x3½; motor, horizontal, 4¾x6 inches, double opposed cylinder; motorpower, 6 m.p.; cooling system, water-jackets integral, tubular radiator, positive gear pump; valves, mechanically operated, protected; carbureter, 2, R. E. Olds' latest patented design; clutch, special adjustable friction; ignition, jump-spark; current, dry battery, two sets; transmission, planetary gear, without internal gears, direct drive, high speed; drive, single chain, heavy roller; steering, wheel, dust-proof gear; mileage capacity, 12-20 miles per gallon of gasoline; gasoline capacity, 10 gallons; water capacity, 4 gallons; wheel base, 90 inches; wheel gauge, 55 inches (standard wagon); brakes, 3, double acting sprocket and hub; speeds, two forward, one reverse.



REO BUS



REO 'BUS—MOTOR AND TRANSMISSION



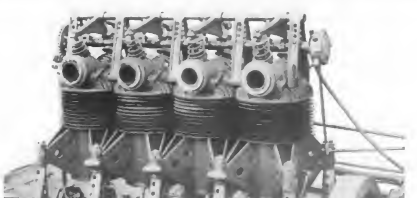
REO RUNABOUT—FOLDING REAR SEAT

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Mechanical Briefs of 1906 Models

PREMIER

THE illustrations show several views of the Premier four-cylinder, 100 m.p., air-cooled racer. This car was built for the purpose of refuting the contention sometimes advanced that an air-cooled motor of large bore and high power would not successfully cool, and while making the mere statement at this time that its object has been successfully accomplished, the argument and facts following ought to prove conclusively to even the most

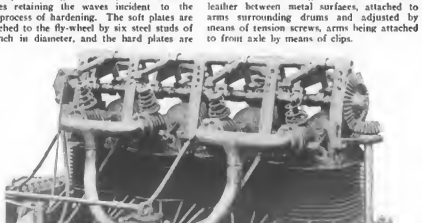


THE EXHAUST SIDE OF THE PREMIER

skeptical that it is no exaggeration to state that even much larger motors than this could be successfully built upon the principles of the Premier.

This car in its entirety was designed and constructed in the shop of the Premier Motor Manufacturing Company, under the direct supervision of Superintendent Geo. A. Weidely. Perhaps the most interesting point demonstrated by this enormous motor is the fact that it is in all essential features an exact duplicate of that in the Premier Model L car, which is their new product for 1906. Hence the performance of the racer may be taken as a positive index to what is anticipated in the stock car. Ordinarily the fast and powerful racing cars have up to this time differed so radically in construction from the regular production of their manufacturers that no analogy existed between the two, hence were practically of little value except by virtue of attracting attention to the name of the manufacturer. Here is an exception. While there is a great difference in power between the regular Premier touring car motor and the racer, designers and mechanics all agree that the ratio of strength and efficiency is more pronounced in the case of the smaller machine than in the larger, hence it can scarcely be construed as a mere theory when the statement is made that if the large, powerful, rapidly moving racer motor can be successfully operated even without a fan, the smaller regular type touring car motor can be expected to accomplish its mission in the most economical and satisfactory manner.

The general specifications of the car are as follows: Four vertical cylinders of 7-inch bore and 5½-inch stroke, surrounded with transverse fins 2 inches in depth; intake and exhaust bonnets set on opposite sides of the cylinder heads at about an angle of 22 degrees from the vertical. Intake valves are 2½ inches in diameter and exhaust valves 3½ inches in diameter, actuated by bell cranks supported by cam shaft operating in brackets on top of cylinder. The four-throw, nickel steel crank shaft is of 2 and 2¼ inches in diameter, with liberal size babbitt bearings. The open crank case consists of an aluminum casting with arms reaching across the machine and bolted on to the side members of frame. The frame is of pressed steel, 142 inches over all, 32 inches wide, tied together by five cross members between the end members. The transmission is of selective, sliding-gear type, having three speeds, mounted on a sub-frame and operated by one hand lever. The clutch is of friction-plate type, and consists of twenty-one plates 9 inches in diameter, of saw steel, each alternate plate being hardened, the hardened plates retaining the waves incident to the the process of hardening. The soft plates are attached to the fly-wheel by six steel studs of ⅝-inch in diameter, and the hard plates are



THE INLET SIDE OF THE PREMIER

held by tongues fitting into deep key ways in the clutch shaft. The clutch is held in position by a coiled spring in the cone of the hub which engages at about 45 degrees angle on fingers terminating in rollers and the opposite ends of fingers apply against the clutch plate. Engagement is normal, and release is effected by means of a foot-operated pedal. All gear bearings are of Hess-Bright pattern. Driving shaft is connected with universal joint immediately behind transmission case, and is self-lubricating.

The starting crank projects over the front frame member, and, owing to the high compression in the motor and the absence of relief cocks, requires the exertion of a full-grown man to start it.

The ignition system consists of a six-volt storage battery, charge for 1,000 to 1,200 miles, wired to a four-vibrator coil and jump spark plugs. The motor will ordinarily start on the spark. The commutator is of special design, consisting of gauze brushes held into contact by springs against the revolving copper cylinder, one segment of which is short-circuited to the axis. Insulation is of mica. This construction is the subject of a patent by the inventor, and is remarkably simple, efficient and free from annoyance, but is quite expensive.

The lubricating device consists of a mechanical eight force-feed oiler, the plungers of which are capable of individual adjustment, and eight copper tubes leading from the oiler, one pair to the walls of each cylinder. The pump is driven from the crank shaft by pig-skin belt ¼-inch wide on flanged pulleys.

The carbureter consists of an enlargement of the regular 1906 Premier carbureter (patent pending), has no springs, and but one moving part, which consists of a hollow piston operated over a cheek float within a larger cylinder, providing automatic control of air and gasoline.

Springs are all half elliptic, 2 inches x 38 inches, shackled at both ends in front, and 2 inches x 42 inches shackled at front end, and rear end sliding in loops, on rear of car. All are five-leaf, leaves being graded, having ¼-inch greatest thickness in center. Shock absorbers used in front consist of drums 5 inches in diameter with 2½-inch face, fixed to side of frame and having metallic bands with leather between metal surfaces, attached to arms surrounding drums and adjusted by means of tension screws, arms being attached to front axle by means of clips.

The photographs show the car without a hood, which has wings or wind sails, with the sides of the hood placed as closely to the sides of the cylinders as the form of construction will admit. The hood is removed for the purpose of showing the detail of the motor.

(Continued on page 108.)

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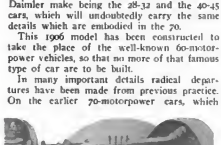
MODERN MOTOR CARS.

NO. 7. MERCEDES

MERCEDES, the great German car with a Spanish girl's name, which causes many to suppose that it is a French car, has long been noted as having set the fashion in modern motor-car mechanics which leads around the world, is again in the public eye, this time in advance of the Paris show, with a new model of 70-motorpower, of which model, however, but few will be brought to this country, the popular-size models in the Daimler make being the 28-32 and the 40-45 cars, which will undoubtedly carry the same details which are embodied in the 70.

This 1906 model has been constructed to take the place of the well-known 60-motor-power vehicles, so that no more of that famous type of car are to be built.

In many important details radical departures have been made from previous practice. On the earlier 70-motorpower cars, which



INLET SIDE, 70 MERCEDES MOTOR

were built at the end of last year, it will be remembered that separate castings enclosed the change-speed gear and the differential with its bevels. Now, however, all these parts are contained in a single gear-box.

Briefly enumerating, before actually describing, the other brief departures that have been introduced on this chassis, a few words should be said about the carbureter, and attention should be drawn to (1) the method adopted for fixing the springs to the axles; (2) the means that are provided for adjusting the foot-operated brake-bands; (3) the modified construction of the main-cluch casing; and (4) the pressure-feed device for refilling the hand-operated lubricator. The carbureter has no less than four spray jets, one of which is solely used when the motor is running "light," while the other three are brought into operation successively as the throttle valve is opened wider and wider. Another noticeable point is that no attempt is made to warm, or to dry, the air that is drawn into the carbureter, the only heating device being a water-jacket that surrounds the four adjacent mixing chambers. Mention, too, should be made of the fact that there is a special mechanism fitted to the car by which the flow of gasoline, both to and from the float-feed chamber, can be entirely cut off by a lever on the dash-board.

In the main, the chassis does not differ materially from those of the same make which are already so familiar, and—as the illustrations will show—its general appearance immediately stamps it as being a Mercedes. The motor is similar to that on the previous 70-motorpower model, with its gear wheels enclosed in a neat casing in front, and with ball bearings for the crank shaft where that shaft is carried by three bearings in the crank chamber.

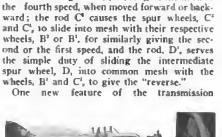
The wheel base is 11 feet 1½ inches, the track is 5 feet and 4 feet 10⅝ inches. In front, the wheels are shod with 910 by 100 millimetres Continentals, and the tires on the driving wheels are 920 by 125 millimetres in size.

It will be observed that the gear box is made in two parts, and that ball bearings are employed throughout. The lower half is fixed by two brackets to the side members of the pressed-steel frame, and by two special bolts to the cross member behind it. In the upper portion, an easily removable lid is fitted above the sliding wheels on the shaft, C, this lid being merely held down in place by four spring catches, but being rendered oil tight by rubber packing.

The unusual features of the gear are that the rear end of the driving shaft, C, is partly supported by the bridge, A', which spans the differential countershaft, and that the two bevel pinions, A and B, are both capable of driving the differential gear. The pinion, B, serves to drive the car when either of the sliding spur wheels, C', C', or A' are brought into mesh with their corresponding wheels, B', B', and B', and it is, therefore, employed for the first, second or third speed, respectively. For the fourth speed, however, the wheel, A', engages with the internally-toothed gear wheel, A', which is solid with the bevel pinion, A, and hence the lay shaft then merely revolves idly and a direct drive is established between the shaft, C, and the pinion, A. Normally, of course, the wheels, A and A', revolve idly about the shaft, C.

The gear is operated in the well-known manner by a single hand lever, which can be moved forward or backward in either of the alternative slots in its quadrant, and by the three rods, A', C', and D'. The rod A' merely controls the single wheel, A', to give the third or the fourth speed, when moved forward or backward; the rod C' causes the spur wheels, C' and C', to slide into mesh with their respective wheels, B' or B', for similarly giving the second or the first speed, and the rod, D', serves the simple duty of sliding the intermediate spur wheel, D, into common mesh with the wheels, B' and C', to give the "reverse."

One new feature of the transmission



OUTLET SIDE, 70 MERCEDES MOTOR

mechanism is that the ends of the differential counter shaft have long plain bearings, instead of ball bearings, fixed beneath the side members of the frame. At the extreme outer end of these plain bearings there is, however, a row of balls quite close up to the large chain sprockets.

All four springs are fitted centrally with special "boxes" that are in turn secured to the axle by a single nut. The spring box, F, fits down upon a slightly recessed face above the axle, which is at this point sufficiently stiffened up to allow the single bolt to pass through it. The spring is thus held in place by the single nut, F, beneath the axle.

In Fig. 4, the float-feed chamber, H, is easily recognizable by its shape. The top of the ordinary central needle, H', which auto-



NEW 70 MERCEDES—AMERICAN BODY BY MOORE-MUNGER CO.

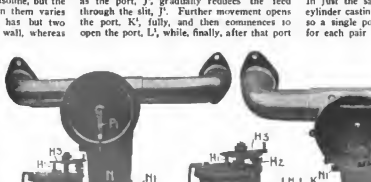
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matically cuts off the fuel supply and thus maintains a constant level inside the chamber, will also be readily distinguished. To the right of the needle, H^1, there is, however, another needle, H^4, which is of a somewhat similar form, though it is normally held up by the weak external spring that surrounds its upper projecting end. This needle, H^4, controls the flow of the gasoline from the chamber, H, to the jets, J, M, L and K, and can be forced downward (to cut off the feed) by the cam disk, H^4, which also simultaneously presses the needle, H^3, down upon its seat. The disk, H^2, is connected up to a small hand lever (H^5, Fig. 7) on the dashboard, and thus the driver can, at a moment's notice, interrupt the fuel feed to and from the carbureter.

The four jets are all arranged in such a way as to receive an equal feed of gasoline, but the size and number of the holes in them varies considerably. Thus the jet, J, has but two small holes drilled through its wall, whereas

action is, therefore, obtained when the jet, J, alone is in operation, and thus ample carburetion can be maintained even though the volume of air drawn into the engine is reduced to a minimum. The action of the throttle valve, when first slightly opened, is to bring the curiously-shaped port, J^1 (in the moving member), opposite to the slit, J^1, before any of the ports, K^1, L^1 or M^1, are uncovered. When the motor is running quite light, the required amount of mixture can then be obtained to a nicety merely by altering the relative position of the port, J^1, and the slit, J^1.

For giving more power, the throttle valve is moved further in the same direction and then the V-shaped edge, K^1, of the moving member begins to uncover the port, K^1—bringing the jet, K, into operation—simultaneously as the port, J^1, gradually reduces the feed through the slit, J^1. Further movement opens the port, K^1, fully, and then commences to open the port, L^1, while, finally, after that port



THE NEW CARBURETER ON THE 1906, 70 M. P. MERCEDES

On the left, it is shown complete with its throttle valve and the branched induction-pipe. To the right, the float-feed-chamber with the four jets, the throttle-valve casing with its four-fold mixing chamber, and the moving member of the throttle valve are each seen separately.

the jet, K, has four large holes and the other jets have two holes each. The jets are closed at their upper ends, and the gasoline only passes out radially.

The mixing chamber, N, which forms the lower portion of the throttle valve, and is solid with the branched induction pipe, is divided off vertically into four entirely distinct compartments—one above each jet—and each compartment terminates at its upper end in the cylindrical throttle-valve casing. The entire chamber, N, has a water jacket, fed by pipes that are connected to the unions, N^1, and its four compartments are all quite open to the atmosphere beneath. At their upper ends the four compartments form the ports, J^1 (a mere slit), M^1, L^1 and K^1, which are covered and uncovered, as required by the rocking inner member of the throttle valve—a view of which member is given on the extreme right in Fig. 4.

Surrounding the jet, J, the mixing-chamber passage is small in diameter, but around the other three jets the passages are of considerable area. A very considerable injection

is wide open, the port M^1 becomes uncovered. Jet after jet is thus successively brought into action until, whereas at first the small jet, J, was alone in operation, all the three large jets, K, L and M, are supplying gasoline to the motor.

All the air required by the motor enters direct from the atmosphere at the bottom of the mixing chamber, N, coming up around the metal dish that is seen in place beneath the jet fitting.

Following the customary Mercedes praetice, two independent foot brakes are provided, both of which are fitted close up to the gear box. One is in the same position as on most chain-driven cars—on the differential countershaft—and the other is fitted to the projecting front end of the lay shaft. Both brake drums can be kept cool when in use by a stream of water that can then be directed inside them, the water being fed, when desired, from the pressure tank above referred to.

The novel feature of these brakes on the 1906 model is that they can be adjusted by hand, without the use of any kind of tool. One brake band has a wing nut, for this purpose, and the other has a small hand wheel, instead. Both the wing nut and the hand wheel are rendered self-locking.

In Figs. 8 and 9, the shape of the castings that form each pair of cylinders is well shown, as also are the yokes that hold down the in-inspection plugs above the valves. The exhaust valves are on the "near" side (Fig. 9), the inlet valves and the igniters are on the other side (Fig 8), and the main castings are given a distinctive tapering shape around the valve chambers.

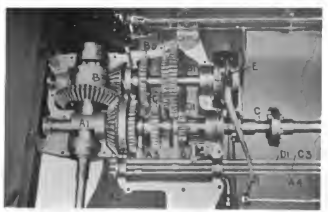
In Fig. 8, the new carbureter is shown fixed in position by its branched induction pipe. The throttle valve is controlled from behind by rods, that connect it with the governor and with the "accelerator" pedal and hand lever. In just the same way that one port in each cylinder casting feeds each pair of inlet valves, so a single port, on the opposite side, serves for each pair of exhaust valves—and the un-

usually simple exhaust-pipe fitting is only held in place by four studs.

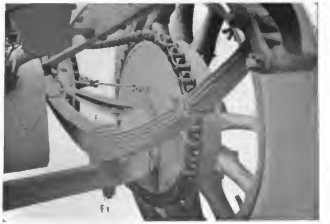
A slight change has been made in the design of the igniters, these now being somewhat more compact than formerly. They occupy, however, the same positions as before, and have small cocks fitted in the main castings—immediately above the contact points—to enable them to be cleaned with gasoline, and to facilitate starting, when necessary; the cocks are similar to those fixed centrally above the pistons—for introducing kerosene to clean the piston rings.

The lower portion of the crank chamber, which is formed by two aluminum casings, is secured direct to the side members of the frame, and between it and the upper portion are held the three ball bearings that support the crank shaft. At the front end of the crank chamber the gear wheels which drive the two cam shafts are completely enclosed in an oil-tight casing, and this casing is of sufficient size to also contain the two additional spur wheels which operate the centrifugal pump.

(Continued on page 136)



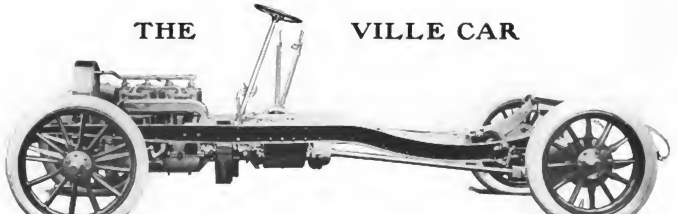
NEW CHANGE SPEED GEAR 70 MERCEDES—TOP VIEW, SHOWING THE WHOLE DETAIL



REAR AXLE 70 MERCEDES, SHOWING HOW THE SIDE SPRINGS ARE FITTED TO THE AXLES

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THE VILLE CAR



The "Ville" motor cars, made by the Société d'Industrie Mécanique, have a bare underframe, bent and made of an elliptic form, intended for mounting bodies with side entrances, such as coupés, landaulets and victorias.

The special and distinctive formation of the under-frame enables the coach doors to be placed at a distance of 45 centimetres from the ground, as in the case of ordinary horse or electric power vehicles, hence all double steps and guard chains which impede access to the vehicle are done away with. The coach-like C-springs, which terminate this under-frame at the rear, give it a highly elegant appearance, whilst its suspension is of an extremely comfortable type.

The under-frame is of cold hammered steel, strengthened over its whole length by an inner counter-plate, the distance between the longitudinal frame plates being maintained by means of cross bars in front, in the shape of a cradle, in which the radiator is fastened by the strongly-made feet of the speed-changing gear, and also by means of three tubular cross bars. In this way transverse and longitudinal rigidity is perfectly assured.

The motor, of 18-24 m.p., has four separate cylinders, with mechanical valves operated on each side by two cam shafts passing into the interior of the gear-case—an arrangement which does away with all separate lubrication.

The regulator, placed at the end of the cam shaft of the suction valves, operates by the longitudinal movement of this shaft upon the height to which the valves will lift, and, consequently, upon the quantity of gas admitted into the cylinders.

The ignition is effected by a Simms-Bosch magneto of high tension, driven by the shaft of the pump, and acting directly upon magnetic plugs, and a pump rotating at half the speed of the motor. Furthermore, a distribution and coil device for ignition may be placed at the end of the shaft controlling the exhaust valves.

This motor, in its entirety, is very simple and easily handled, as each part is easily and separately accessible. The crank shaft is held by five bearings, fixed to the upper part of the gear case, which admits of a rapid inspection of the bearings and heads of the connecting rod, by merely removing the lower portion, which only acts as an oil tank.

This arrangement had already been adopted in the Georges Ville motor of 30-35 m.p.

The car can be made to run backwards by means of mechanism so constituted that it is an absolute novelty; it is independent of the speed-changing gear and is placed entirely in the steering wheel.

This mechanism comprises a central pinion, keyed to the end of the crank shaft, and a closed box, provided with attachments which engage with this pinion, and an inner crown made in one piece with the live shaft, and upon this box there is fixed a leather coupling cone and a brake crown.

It will at once be apparent that when the cone is caused to bear against the cup of the flywheel, under the pressure of the coupling spring, the attachments will be blocked by the central pinion—they cannot rotate upon their axes and thus carry the shaft along at a speed equal to that of the motor without loss or friction of any kind in the direction in which the car is running forward.

Upon pressing upon the uncoupling pedal the cone is made loose and the car is no longer dragged along. On continuing to exert pressure upon the same pedal, influence will be brought to bear upon a band brake which renders motionless the box carrying the carriers, and these latter, acting as simple intermediaries, cause the inner crown to rotate in a direction contrary to that of the motor, and thus cause the axle to rotate at a speed three times less in the direction of the backward travel.

This reversing operation acts progressively, according to whether the uncoupling pedal be operated more or less strongly or pushed quite home. Its use, similar to that of steam-reversing mechanism, is not only especially simple and silent, but it also avoids all manipulation of the lever, thus leaving the chauffeur's hands quite at liberty. As a matter of fact, it will act, be the multiplication what it may, and the car can be run ahead again without having had to touch a speed-changing lever. This is especially valuable in towns where heavy traffic often renders such a manœuvre necessary.

The speed-changing gear, properly so-called, is, as will thus be seen, much simplified and of smaller size. It comprises four speeds, by the aid of two sliding gears, the fourth being for direct engagement, and all four are independent of each other.

The upper portion of the gear-case carries the driving organs, and is attached direct to the longitudinal plate of the under-frame, to which it thus acts as a series of cross ties, thus rendering it very rigid.

The rear bridge receives the speed-changing movement by a double and very long universal joint device or Cardan. It is made of steel and formed of two truncated cones joined together at their wide base. This rational form combines great lightness with absolute solidity, whilst there is no possibility of twisting or bending even if very heavy bodies be used. The live shaft is supported at its hub by two large ball bearings placed at a distance of 100 mm. from each other. It is solely upon these, and not upon the ball bearings of the differential, that the weight of the vehicle rests, so that in case of any violent lateral shock (due to side slip), they prevent the axle from getting bent inside the bridge.

The bridge is firmly bolted upon the springs, and is not held by any connecting rod or draw bar. The springs alone take up all the tensile stress. They also serve as dampers to the shafting, thus imparting greater sweetness and smoothness to the coupling gear.

The steering gear is carried direct by the upper portion of the speed-changing device. It consists of a horizontal screw with four threads, driven by means of two conic wheels, operated by the steering wheel.

Upon this screw there moves a nut attached direct to the connecting rod, controlling the front wheels. As will be obvious, all the play being thrown upon the screw, without any multiplication by a large lever arm, the stress upon the threads of this screw is very slight. There is thus no wear and tear, nor any play, and, in fact, should any play be set up it would be too small to notice, as there is no lever arm to multiply it.

This steering gear is, therefore, very simple and strong, besides being absolutely non-reversible.

The car is provided with three brakes, all independent of each other:

1. The reversing device, operated, as we have seen, progressively by the uncoupling pedal.

2. A steel plunger brake, placed to the rear of the speed-changing device, and acting upon the differential. It is actuated by a hand lever, which, at the same time, throws the mechanism out of gear, so that the car can be brought to a standstill without stopping the motor.

3. Two metal brakes, acting upon the interior of the crowns of the rear wheels. These brakes are operated by the right-hand pedal. They do not act upon the uncoupling gear and can stop the car, although the motor may be running at full speed.

The chauffeur can thus, whilst standing, stop the car by two different brakes; moreover, he can reverse the car whilst having both his hands at liberty to attend to the steering.

Its other feature is the use of "C" springs in most coach work, a practice borrowed from the builders of horse-drawn coaches. "C" springs will be largely in evidence at the coming Paris show on fine cars. Their use indicates a reversion to lighter and more graceful forms of spring mounting, and a partial abandonment of the heavy and ungraceful elliptic-spring touch platform on the rear part of the chassis. The use of "C" springs is permissible there because of the current practice of placing the water in front.



THE VILLE LANDAULET SHOWING LOW STEP PERMITTED BY THE DOWN SWEEP OF THE FRAME

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Mechanical Briefs of 1906 Models

DARRACQ

AMONGST the various new models now being introduced abroad, those of the firm of Darracq & Co., of Suresnes, France, may be mentioned as cars of particular interest. They comprise cars of from 8 to 30 m.p., suitable for adaptation to all kinds of bodies, and they are especially suitable for touring purposes, judging from the practical tests they already have to their credit—tests, too, which were somewhat out of the ordinary run. These models are, however, so numerous that a selection must be made among them to allow a description of those which are the most interesting.

Amongst the latter a prominent position is occupied by a 12 m.p. tonneau for four persons. It is constructed with a long or short under-frame. With the long under-frame the width of the gauge is 1,250 mm., the wheel base being 2,650 mm., the length of the woodwork body being 2,450 mm. by a width of 820 mm. Altogether the length is 3,800 mm., the width 1,450 mm., the height 1,500 mm. and the weight 900 kgs. In the case of a short underframe the wheel base is 2,200 mm., the length of the body 1,800 mm., the total length 3,300 mm. and the weight 800 kgs. The other sizes are identical in both models.

The motor has two cylinders and controlled valves. The cylinders have a bore of 102 mm., and the throw of the piston is 120 mm. The ignition is effected by means of a battery with coil and sparkling pings, similar to the other models, however. It may also be effected by means of a magneto. Between the motor and the speed-changing device there is inserted a dash-pot, or silencing arrangement, in order to avoid all vibrations and shocks to the gearing. The speed-changing gear is of the movable or "traveling gear" type. The three speeds, and the reversing travel, are all controlled by the same lever, the third speed being for direct engagement.

The under-frame is of hammered sheet steel, and is hollowed in front to permit of sharp movement. It is cambered at the rear to admit of the attachment of an extra-low carriage or body. The distance between the top of the under-frame and the ground is only 550 mm. The protective jacket or plating is formed by the under-frame itself, and it protects all the moving parts of the car against the influence of water, mud or dust.

The brakes are arranged within the drums and are mounted upon the transmission gearing of the differential and upon the driving wheels. The pressure exerted is, it is said, mathematically equal both in a forward and backward direction. The radiator is of the wing or flanged type, with a centrifugal pump. The steering gear is non-reversible, adapted to be easily regulated and of the axial transmission type. The wheels are of wood and are of equal size, measuring 750x85 mm.

Differing only in the style of the woodwork body, and in a few constructional details, these 15 m.p. cars, mounted upon a long underframe, are extremely comfortable vehicles. The motor is of the four-cylinder type, with controlled valves, the boring being 90 mm. and the throw of the piston 120 mm. The distance between the ground and the top of the under-frame is 580 mm. The radiator is of the beehive type, with a large cooling surface, ventilator and centrifugal pump. The wheels are all equal and measure 810x90 mm.

The gauge of the under-frame is 1,300 mm. and the wheel base is 2,800 mm.; the car body measures 2,450 mm. in length and 870 mm. in width.

Similar to the preceding model, the 20-22 double-phaeton type, for touring purposes, is only mounted upon a long under-frame. The gauge is 1,300 mm. and the wheel base 2,660 mm. The woodwork body measures 2,450 mm. in length by 820 mm. in width, the total length and width respectively being 3,815 and 1,500 mm.; the height is 1,550 mm. and the weight 1,100 kgs.

The motor is of the four-cylinder type, and the ignition is provided with a regulator upon the inlet. The under-frame is suspended to the rear by semi-pincer springs. The radiator is of the beehive type, with ventilator. The wheels are of wood and are all equal. Their diameter is 870 mm. and their width 90 mm. In all other respects the construction is identical with that which has already been described.

The 30 m.p. model on a special under-frame, either long or short, is also intended for making extensive tours. With a long under-frame the gauge is 1,350 mm., with a wheel base of 3,250 mm.; the length of the body is from 2,400 to 2,500 mm. and the width 870 mm.; the total length and width being 4,500 and 1,550 mm. respectively. The height is 1,600 mm. and the weight 1,250 kgs. With a short under-frame the dimensions are identical, excepting the following: Wheel base, 2,700 mm.; length of body, 2,200 mm.; total length, 4,200 mm., and weight, 1,100 kgs.

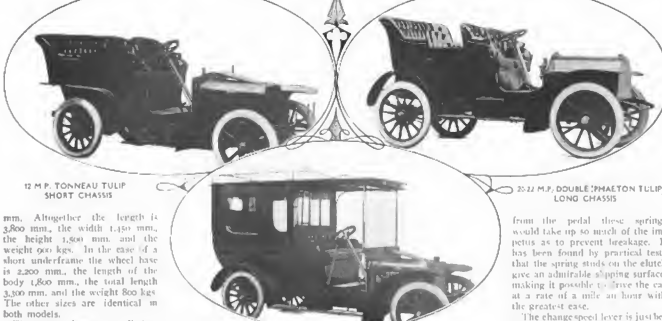
In radical features the 1906 model will not be a great change from that of previous Darracq practice, but several changes have been incorporated which should certainly be appreciated. The fitting of a progressive clutch is the most important change. The leather-faced clutch is retained, but four studs, placed semi-distant, pierce its circumference near the outer edge, raising the leather very slightly. Within the cone are bolted four metal sleeves that contain the terminals of the studs and a spring of special construction. The pressure of the springs acting through the broad-faced studs on the surface of the female cone prevents the clutch being let in with too much force; even if the foot were suddenly released from the pedal these springs would take up so much of the impetus as to prevent breakage. It has been found by practical tests that the sprung studs on the clutch give an admirable slipping surface, making it possible to drive the car at a rate of a mile an hour with the greatest ease.

The change-speed lever is just below the steering wheel, so that the whole control is from the driver's seat.

Push-down or piano pedals have been abandoned for pedals of the push-forward type, which have been given a long leverage and so placed that the foot is in a natural position when in use on the pedal; the left pedal acting on the clutch and at the same time diminishing the supply of gas so as to prevent the motor racing when suddenly relieved of a load. The right-hand pedal withdraws the clutch and controls an internal expanding brake acting, metal to metal, on a drum just behind the change-speed gear. A hand lever controls the internal expanding brakes on the rear axle.

Henery's double win of the classic Ardennes and the Vanderbilt race in the same year emphasized world wide the merit of the Darracq construction, not only from a racing point of view, but particularly also from a mechanical point of view, the combination of high power and light weight proving irresistible in both events. The racing car is peculiar, because it has no differential, and also on account of its tangent, wire-spoked metal wheels.

For the Florida meet a Darracq racer is promised that will do a mile in thirty seconds, two miles a minute, the *ultima thule* of racing speed of a motor car.



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A TRANSPARENT DASHBOARD IGNITION OUTFIT

MOTOR cars should have all parts that need attention easily accessible. This important requirement is met by the new Mosler Transparent D. B. I. Outfit. Delicate timing devices, sensitive vibrating coils should be so constructed as to be promptly reached by the operator of a car at any and all times.

The less wiring, the less possibility for grounded circuits; the fewer complications, the more reliable the outfit, the easier to trace the trouble, the less liable for trouble to occur.

The device herewith illustrated combines all the good points above mentioned.

In a glass case, handsomely trimmed with solid brass frame having a hinged door provided with a Yale lock, are contained, safely protected from dust and moisture, a Mosler primary commutator and secondary distributor, and a specially built coil removably secured by a spring catch.

This allows the adjusting of the coil from the primary wires of the battery, even when removed from the car and where all parts of the vibrator are easily accessible.

In the majority of cases it will be found that coils are permanently attached to the car. Very often timers are placed in the most difficult position, often behind the radiator, and sometimes between the frame of the car and the motor, where they can be discovered only after the most searching investigation and a lengthy travel through dirt and oil from wire to wire.

The wiring in the majority of cars runs along the metal frame, so tending to produce substantial ground in the circuit, which often necessitates the tearing down of all the wiring, and the changing of the plug, timers and coils, ere the trouble is discovered.

None of the above disadvantageous conditions can possibly exist with the Mosler apparatus. Everything of vital importance is on the dash-board fully exposed to view.

The primary commutator and secondary distributor is firmly held in place by being bolted to an auxiliary bearing fastened to the heavy plate glass of the rear panel, provided with double adjustable cone ball bearing. It is operatively connected to the motor by either a bevel gear drive, or a light chain and sprocket drive, as may be found most suited to the conditions or type of motor.

Only one wire brings the primary circuit from the battery to the terminal secured to the lateral glass panel of the cabinet, and four wires take the secondary from the rear panel to the four respective spark plugs on the motor. Five wires only are used to make the outfit wholly operatively complete, all other electrical connections being made inside by brass plates forming positive connections between the respective terminal posts.

As stated, the primary circuit which connects on the left hand side of the case penetrates through the glass panel. Through a specially designed hook it connects directly by spring pressure with one terminal of the coil. The coil contacts are Baker hardened-iridium platinum shots, which are soldered to the auxiliary vibrating plate and to the screw forming the other contact.

The primary circuit, after traveling through the coil and vibrator, comes through the other spring-connected post of the coil, directly to a semi-circular disk, whence it is carried by a friction post to the multiple contact in the primary circuit, where it is also grounded. The secondary current generated in the coil is also grounded through this post; the other leg of the secondary comes from the bottom of the coil and is carried by a hard rubber support and brought over from there by a movable arm to the center of the distributer.

This arm can be raised up out of the way of the center of the distributer so as to provide means for substantially rendering the car inoperative, should it be desired to prevent its use while left in a garage.

The secondary distributer is of the regular Mosler construction with heavy porcelain insulation, a Meteor T-shaped arm carrying the secondary current consecutively to one post after another. Connections between this T-shaped arm and the central piece, O, of the distributer is by means of a ball friction contact. The current is sent to the platinum extremities of the four secondary posts from the T-shaped arm by means of an auxiliary spark. Equally adjusted between the four cylinders, which acts as an intensifier of the current, known as a "Spark Gap," it is particularly efficient when the plugs have become heavily coated with carbonized lubricating oil.

The secondary posts have rolling friction contact against semi-circular plates secured to the rear glass panel of the case. Each of these semi-circular plates is electrically connected to a terminal post with necessary screws and lock nuts for the connection of the four wires leading to the four plugs in the motor.

The "Spark Gap" is visible at all times when in operation through the bevel-edged plate-glass front of the distributer, which is held in place by a spring wire so as to be readily removable in case of need.

The case of the primary commutator and secondary distributer is made separable, and is held together by pins and a spring catch.

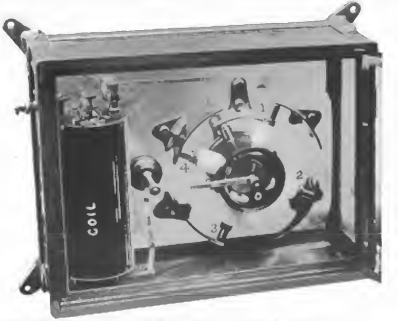
To gain access to the primary contact of the timer, the outfit is thrown in either direction, so as to remove the friction from the four plates, and also cut out the contact of the primary circuit, thereby avoiding secondary shocks. The central arm is raised away from the center of the distributer, and by releasing the spring catch the four secondary posts and bait of the case pull right off from their seat.

The center is optionally of fibre or of tool steel. In the event of fibre being used, four sections are cut out, into which are inserted phosphor bronze contacts. These contacts ground the circuit brought to them by a tapered steel shot held in position by a very lively spiral spring.

In case the tool steel center is used, four hardened cams with rounded and ground edges are raised on the center. Each of these cams in turn has a rolling friction contact against a hardened steel ball carrying the primary current.

Only four volts are required to give a steady running of the motor, but the outfit is so designed that it could be used for ten volts without any damage, making it operative in conjunction with a dynamo and storage battery.

The outfit once set in harmony with a motor is so arranged that it can be taken apart and replaced into position without any experimenting for determining the position of timing. On the rear of the brass plate is provided means for advancing and retarding the time of ignition.



THE MOSLER TRANSPARENT DASHBOARD IGNITION OUTFIT, SHOWING THE GLASS DOOR REMOVED



FORD CARS IN CAB SERVICE ABROAD

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Mechanical Briefs of 1906 Models

HUMBER

FLUSHED with their successes abroad, the makers of the famous Humber cars, an English production, now propose to be active competitors for a share in the American trade and are advertising for the first time in this country two of their Beeston Humber models, the 16-20 m.p. and their 8-10 m.p. Coventry, of the four-cylinder type. All three of these cars are famous throughout Great Britain because of their recent wins in the hill climbing trials, the Scottish Reliability trials and at the Brighton, Blackpool, and Skegness meets.

The 16-20 motor is of the slow running type, its normal speed being about 900 r.p.m., the bore being 95 mm. and the stroke 125 mm., the



THE 16-20 M. P. HUMBER

cylinders being cast separately with large water jackets. An automatic carbureter is fitted with a gravity feed, the throttle being governed by a variable lift to the inlet valve. A double system of high tension electric ignition is fitted by means of a magneto and accumulator. Water cooling is by a honeycomb radiator, with a fan at the back, the rotary pump being positively driven from the engine. The clutch is of aluminum, covered with leather, and self-contained in the flywheel, with no end thrust on the shaft, but owing to the amount of the control by the accelerator the clutch has very seldom to be shifted in driving. The change speed gear gives four speeds forward, and one reverse, with a direct drive on the top speed. The gear is so designed that the changes from one speed to another can be made without meshing the intermediate gear wheels. For instance, a change can be made from the top speed to the low speed without interfering with either the second or the third speed gear wheels, the main shaft being fitted with an auxiliary ball-bearing to prevent torsion. Double-acting internal metal-to-metal foot brakes of large proportions are fitted to the driving shaft, while hand-applied internal metal-to-metal and self-compensating brakes are fitted to the road-driving wheels. The wheels are fitted with heavy Dunlop tires, 815x100 mm., being notable in this because in many makes of cars of this size and weight 90 mm. tires only are fitted. The control is remarkably simple, one lever being used for change speed and reverse, while the levers operating the ignition and the variable lever on the inlet valves are fitted just beneath the steering wheel. A foot accelerator pedal, operating the variable lift, is fitted to work in conjunction with the hand lever, but also independently of it. A peculiarity of the steering wheel is that it is neatly covered with leather, which is stitched on. The body is of the double phaeton, Roi des Belges type, with a side entrance so as to comfortably seat five persons. It is upholstered in leather, with a roll-over top, buttoned and pleated. The chassis, however, is adapted to carry a landaulette or brougham body on its pressed-steel frame.

The 8-10 m.p. car is very similar in construction of detail, save that the bore and stroke are 77x108 mm., the 8-10 m.p. Coventry car, however, having a 3¼-inch bore by 3½-inch stroke, its normal speed being 1,200 r.p.m., a Longuemare carbureter being fitted with gravity feed, and throttle governed in connection with a hand throttle. The small cars are fitted with either three or four-seated bodies, the three-seated body having two seats in back and a driver's seat only at the front, and the four-seated body having a swing front seat to give a side entrance. All the cars are fitted with a full set of accessories, so complete as to be surprising to the average American buyer.

FOUILLARON

THE popular type of under-frame which the Paris firm of Fouillaron is constructing for the 1906 season is characterized by great simplicity.

The arrangement of the essential organs may easily be seen from the illustrations. These organs are the coupling cone, the speed-changing mechanism, the Cardan gear, and the differential, which connect the motor to the rear wheels.

The characteristic feature of this transmission gear is the speed-changing device, which is operated by a driving chain and two extensible pulleys.

Each pulley is formed of two lamellated jointless cones, the arms of which are so intertwined that the top of each cone penetrates the interior of the other.

The bottom of the pulley is represented by the circumference limiting the intersection of the two cones opposed to each other. One of these cones is movable, and can, by sliding along the shaft, penetrate more or less into the stationary lamellated cone and thus modify the depth of the circle of the bearing neck.

A lever, connected to a non-reversible driving mechanism, enables one of the cones of each of the pulleys to slide along simultaneously, but in the contrary direction.

This movement causes a variation in the diameter of the throats or necks, without modifying the tension of the chain, and enables the entire gamut of the speeds, comprised between very wide limits, to be utilized.

A spring, the tension of which may be safely regulated whilst the car is running, is inserted in this driving gear, and tends to augment at the same time the diameter of the two pulleys. It automatically takes up all play that might be set up at high speeds by centrifugal force, does away with all slipping, and causes the driving gear to run very smoothly.

The driving gear works under particularly advantageous conditions, inasmuch as all the various flexions supported by the chain neither cause wear and tear of the leather, nor heating of the belting, nor loss of energy.

The chain which transmits the motive force is also worthy of attention. The links or blocks of chrome dressed leather (thus enabling the chain to adapt itself to the shape of the pulley) are mounted upon a strong chain of case-hardened steel. It is interesting to note the excellent way in which all the stresses are divided up between the chain, which, although flexible, resists all tractive efforts, and the leather adheres silently and securely.

This very considerable adherence of the driving chain and of the narrow groove in which it is contained admits of a very low tension being used, thus enabling the transmission gear to work perfectly, despite its lightness.

The driving and management of a Fouillaron car differs in many points from that of a car fitted with the usual gear. For instance, the speed may be changed without disengaging the gear, and, likewise, practical advantage may be taken of all the speeds comprised between very wide limits.

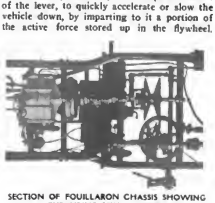
Thus when ascending a gradient with a Fouillaron no attempt should be made to maintain a considerable development of power; on the contrary, the motor should be checked and kept at its normal speed, for which it produces all the power necessary.

The car may be stopped without the slightest apprehension or slowed down upon the steepest gradients and then started and accelerated progressively, there being no obstinacy to fear on the part of the machine, as the motor will not race when the second speed is put on, nor will it threaten to jam when the third speed is put on.

It is also possible, by an abrupt movement of the lever, to quickly accelerate or slow the vehicle down, by imparting to it a portion of the active force stored up in the flywheel.



M. P. INSIDE DRIVEN COUPE, FOUILLARON



SECTION OF FOUILLARON CHASSIS SHOWING EXPANDING PULLEY DRIVE

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Motor Business Wagons

THE HEAVY ELECTRIC

EVERY business has its problem of haulage. Some of them fall into natural groups, notably those who have heavy loads to deliver regularly, along defined routes, such as coal, iron, oil, and the like, and some of all these trades have adopted the commercial vehicle. In yet others the cost of delivery is a vital factor in determining the ultimate ratio of profit. Brewing is important among these, and to those in charge of this industry it soon became obvious and palpable, after the introduction of the motor car for pleasure, that the new vehicle would be converted from a money spender into a money saver.

Early experiments encouraged effort, and experience has demonstrated the advantages of the motor car for business purposes. Every field of commercial activity is adopting it, in one or other of its developments—electricity, gasoline, or steam. Hard-headed, close-fisted business men have invested millions in business motor wagons that have proved profitable. The same story is told by the rapid increase of motor-car manufacturers and the important part that the business wagon occupies in their business of making motor carts.

Entirely irrespective of the type selected to meet the necessities of this or that business, there are certain self-evident facts common to them all: a motor car occupies less spare than its equivalent in haulage in horse-drawn vehicles; it requires but a plainly built, small shed, as against yards, stables, lofts, harness rooms and refuse receptacles, and space is costly in cities; in the next place, it requires fewer employees, for up to the moment of its being put into use, it stands immobile; furthermore, the area over which it can carry a load is appreciably wider than can be carried by horses. These are all self-evident facts.

An inquiry into results from the users' point of view (and for that purpose no better selection could be made than the George Ehret and Jacob Ruppert Brewing companies) brought forth interesting facts. It is three years since the Ehrets had their first electric motor made by the Vehicle Equipment Company, since which both they and the Rupperts have run them continually, and have quadrupled their quantity.

The first year's experience was discouraging, as was natural, for the whole process was new and experimental; yet both firms persisted, and practically all the old difficulties have disappeared, or been reduced to a negligible minimum. Various improvements were found necessary; for instance, the power was found to be below requirements, but has since been doubled by the adoption of the Viquest battery. One of these batteries was recently run for four consecutive months, and when it was opened for examination and washing, very little sediment was found in it, as against those of the earlier days, which, within a much smaller time, would have sediment frequently nearly up to the bridge. Then again tires were a perpetual trouble and expense, but this has settled down to an eminently satisfactory service from Firestone tires.

Each motor wagon meant an outlay of $4,000, which is just double the cost of a horse-drawn wagon, two horses, and harness. But initial cost has little to do with the problem; the question is which, for the capital expended, is the more economical and effective. On this point, the experience of the Ehrets is the most valuable, because they approach nearest the coming conditions, i.e., they have the largest number of motor vehicles in use, they generate their own electric power, they have made provision for easy and constant supervision of the machinery, and they do their own repairs. The results of their experiences may be condensed into a few pregnant facts.

First: The simplicity of handling the motor vehicle. It is complete in itself; in it is comprised wagon, horses, harness, stables, loft, food, etc., all in one; it can be recharged by simply connecting it with the supply cable.

Second: It can work all day. It starts on its first journey when the horse wagons do, and has been out ten miles, and is home again before the horse wagons can reach the same outward destination. Then it is ready to go out again with another load; and frequently with a third, whereas one journey, out and home, with a five-ton load behind them, is enough for the horse for the day.

Third: It is cheaper; for a battery charged



A HEAVY ELECTRIC TRUCK, SIMILAR TO THAT USED BY EHRET

with 106 volts, 20-30 amperes of electricity will run a load thirty-one miles or farther.

Reasonably enough it may be asked, "Why are not the exact costs of all these relative things given so that they may be compared?" The answer is simple. It is because, in the present stage of the employment of the motor vehicle, the two systems are run by the same staff indiscriminately, and it is not possible to differentiate them. For instance, the electricity at Ehret's is generated by their own machinery for light, heat, and power; and it is not possible to say what proportion the rest of the power used by the motors should bear. The only other course is to consult the scale of a public company, such as Edison's, but here again another difficulty is met, for Edison's charges scale down from 10 cents per kilowatt hour, to 5 cents per kilowatt hour, according to the quantity of electric force used. Then again the men who attend to the horses perform the same function for other horses, not so used, and do other work; and finally the overhauling of the motor vehicle is done by the same staff who build and repair the horse wagons. The whole question of cost must, therefore, rest on a kind of rule of thumb arrived at by the owners of the concern, who see with their own eyes every detail of the operation, and who have no need, from long experience, of bookkeeping to enable them to form a judgment. They are amply satisfied that they are getting good results, and that the time is coming when they will get even better.

One department of expense, that of drivers, is exactly the same in either system, but the operation of turning on and off the power, and of steering is easier and less wearing than the driving of a pair of equine giants, and one man, who both drives and delivers the barrels, is the crew in both horse wagon and motor car. The weight of a load on the motor could be almost twice that of the horse-drawn wagon, but its entire capacity is seldom used, because the man who drives and delivers cannot handle more than 60 half-barrels and 25 quarter-barrels in one journey. Pace, with a full load, as before stated, is always from 35 to 50 per cent. greater with the motor vehicle than the horse-wagon, but for emergency calls for smaller loads, required at once, the difference is appreciably increased.

It is too early yet to compare the length of the life service of an electric motor wagon, as against that of a horse-drawn outfit, but when a motor is kept in proper repair, it has practically an endless life; whereas a horse, whether it lasts a year, or ten, has a steady and certain decline. The parallel may be brought closer by comparing the legs of the horse to the tire of the motor car. When the tire wears out the loss is absolutely covered by putting on a new tire, but when the one leg of a horse gives way the whole horse is useless.

On the whole, from the testimony of reliable, observant, shrewd users of the industrial motor it has definitely established a permanent position, as (1) requiring diminished space for its storage; (2) fewer attendants; (3) quicker delivery; (4) increasing the area of delivery; (5) expanding and retracting its capacity, according to the demands of the season; (6) absence of cost when not at work, and (7) costing less per ton mile, when at work, than any other form of haulage.

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Diamond Wrapped Tread Tires

The Tires that Made Good on the Reo Mountaineer are the Tires that Make Good everywhere

Under date of October 26th, Percy F. Megargel wrote us from Bois City, Idaho, after putting on a new set of Diamond Wrapped Tread Tires:

> "There is no doubt in my mind but that the original four Diamond Tires would have carried us through to Portland, but by having them recovered now they will carry me back to New York"

"Diamond Wrapped Tread Tires helped win the National Trophy in the recent economy test. Their Record was perfect."

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the Neck, Ears, Face and Chest

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Waterman Bros., of *Fresno, Cal.*, write about Goodrich Tires:

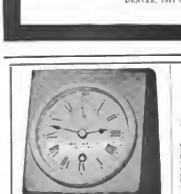
"We sell a great many tires, but more Goodrich Tires than any other two makes combined. Goodrich Tires give us excellent satisfaction, *twenty-five thousand miles being a not very unusual record.*"

THE BAILEY "WON'T SLIP" TIRE. Regular Goodrich construction, but provided with the Bailey "Won't Slip" Tread. Prevents slipping, skewing or skidding.

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Clocks "Best in the World" Quality of

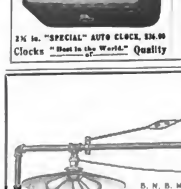
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"CHELSEA"
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Uses no attachments to its motor. Allows of washing at night as well as daytime. Showing the light shows a washed car. Saves time.
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EVOLUTION OF THE MOTOR BOAT

(*Continued from page 61.*)

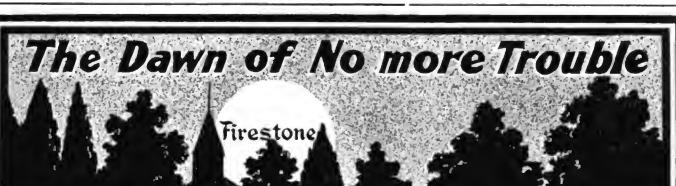
tion of the displacement and a general improvement in hull design and construction, giving a faster and generally better boat for cruising and every-day use.

What has happened is briefly this: In France, as in England and Germany, the power launch amounted to little more than a yacht tender propelled by a "paraffin" engine, a two-cycle motor of the same type as then common in America, but using kerosene in place of gasoline and consequently less certain and efficient. About 1901 some of the French motorists, notably the Pauhard people and the versatile Marquis de Dion, fitted their car motors into such launch hulls as were conveniently available and began to race; the speed, of course, greatly surpassing the old "paraffin" launches. Though not noted as a yachting nation in comparison with England and America, France nevertheless possesses some very clever yacht designers and constructors, men like Normand, the torpedo-boat expert; the elder and younger Tellier, Seyler, Schuque, Le Marchand, Pitre, Chevreux, and Guédon. The fact that all of these, with the exception of Normand, have been limited in their previous practice to sailing yachts, and those in the smaller classes, has in no way unfitted them as designers of launches; the keen racing of late years in France has kept them alert to all novelties of design and construction at home and abroad, and though denied the privilege of testing their talents on the design of America cup challengers, they are able to hold their own in all classes within the range of their practice.

The "auto boat" or "canoe automobile," as it was at once termed by its inventors, has appealed to both the business and sporting instincts of the French, like the motor car it is an admirable means of advertisement, and at the same time it affords the most exciting sport. So rapidly has it grown in favor both with the immediate participants and the public that the launch races are even more numerous and well attended than the contests on the road. What has been done this year at Nice and Monaco, and what is planned for the balance of the season, has already been told in Motor. It goes without saying that, stimulated largely by business interests and with no ends in view but extreme speed and advertising, the line of development is by no means the best for the broad interests of the sport; but there is room for hope that the present extremes may in time lead to more moderate methods. As it is evident from what has already been said that the engine is the one controlling feature of all launch design, it is worth while to examine the latest masterpiece of the French engineers. This is a motor of 300 motor-power, designed and built by Messrs. Desmarais & Morane, builders of the well-known Delahaye motor car, for installation in two racing launches, *Le Dubonnet* and *Trident*, which have figured in the races of the season; the hulls being 15 meters, or 49 feet 2 inches, in length. In model they were designed solely for speed, the construction being the lightest possible.

There are four cylinders, each 12 inches diameter by 8¼ inches stroke. According to reports which are believed to be correct each cylinder was bored from a solid forged billet of nickel steel, the raw material costing over $500, while the labor amounted to something like the same figure. The walls of the cylinder are very thin, a wide flange is left at the top, another at the bottom, and a third at the lower limit of the water jacket. The jacket is of drawn copper tubing, spun with corrugations to admit of expansion and contraction; the upper end being flanged inward to form a gasket between the upper surface of the cylinder flange and the head. The lower flange has a groove turned in its circumference and into this groove the lower edge of the copper jacket is forced by a flat steel band set up by a bolt and nut, thus making a perfectly tight joint. The base is built up of five castings of steel, in A form, bolted together, the lower ends of the legs resting on steel angles which bed on the engine keelsons with steel cross braces. The four-throw crankshaft is of a special grade of steel,

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SIDE WIRE TIRES

This tire is recognized as the *standard* commercial tire of the world.
By reason of their *demonstrated merit* they now outsell every other commercial tire on the market—*four to one.*

THE REASONS

for this great lead are obvious, inasmuch as MERIT—tried and true—always triumphs over pretensions, or representations that are not borne out by *fact.*

"Then why not FIRESTONE?"

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Change Tires—Thirty Seconds

Goodyear Universal Rim

SUPPOSING you were 25 miles from home, and your tire exploded. And you hadn't another with you. And when you stopped at the garage, the man said: "I'm sorry, but I haven't a single tire of that make."

Wouldn't it make you mad?

Of course it would, if you had an *ordinary* rim.

But if you had a Goodyear Universal Rim, you would smile and say: "Bring on any old tire, as long as it's a clincher, my rim will take it." And in less than three minutes you would be enjoying the scenery once more.

Because it *isn't* an all day job to take off and put on a tire when your car has Goodyear Universal Rims. Just jack up the wheel and in 30 seconds the old tire is off, and in another 30 seconds the new tire, ANY kind, is on. You need no tools but the hands. And are "fixed up" and on the road while the man with *ordinary* rims is hunting for his crowbars and levers.


Figure 1

You see the flange comes right off on Goodyear Universal Rims like Fig. 1.

And then a 26-inch tire (for example) slides right on the 26-inch rim like Fig. 2, as easy as you would put on your hat. On an ordinary rim, you would have to pry that 26-inch tire over a 27-inch flange. You know what a profanity inspiring job that is, and it doesn't do the tire any good either.

Now this is all there is to taking off and putting on a tire when you have Goodyear Universal Rims. See how simple and easy it is.


Figure 2

The rim is made up of four parts, like Fig. 3.

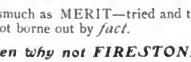


Figure 3.

Nos. 1 and 3 are the removable flanges (rings) which can be adjusted to any clincher tire.

No. 2 is the base of the rim attached to the felloe of the wheel. It can be used without fitting on any standard wheel built for standard clincher rims.

No. 4 is the binding ring which holds the flanges in place.


Figure 4.

If you have decided to leave yourself of all tire troubles and in consequence ride Goodyear Detachable Auto Tires, a section of the rim when put together, would be like Fig. 4.

Or, if you ride an ordinary clincher tire, the rim section would look like Fig. 5.


Figure 5.

The ring which holds the flanges in place is split at a point alongside the valve stem, like Fig. 6.

It can't be removed (and, of course, the tire can't come off) while the flange presses against it. This flange is kept tight against the ring by a plate which slips over the valve stem like Fig. 7.



Figure 6

When you wish to remove the tire, loosen the nut which holds the valve stem down, and push the stem up through the rim. This pushes up the plate and lets the flange ring slide inward like Fig. 8.

Then lift out the binding ring, slip off the flange, and pull off the tire.

Time, 15 seconds.

No tools but the hands.


Figure 7.


Figure 8.

Those who are weary of tire troubles are specifying Goodyear Universal Rims. This equipment costs no more than the ordinary kind, and multiplies the pleasures of motoring many times.

Ask for our "Good News Book" and find out all the good points of the Goodyear Auto Tire and Universal Rim. It's of vital interest to the Manufacturer, Dealer or User who is satisfied with nothing but *the best.*

THE GOODYEAR TIRE & RUBBER COMPANY, Mechanic St., Akron, Ohio

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To insure your getting them, *specify Imported CONTINENTAL TIRES at the time the order is placed.* In that way you are *sure of getting what you specify.* We carry a large stock at all our branches in the principal cities of the United States. Notify us at the time you place your order and we will see to it that no delays occur on our side.

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The Utility



Price $30

Headquarters for Everything Pertaining to MOTOR CARS

Lamps, Horns, Goggles, Pumps, Jacks, Plugs Batteries, Speedometers, Odometers, Coils, Tires

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hollow in the crank pins and bearings, and said to have cost $300; the connecting rods are of nickel steel, hollow and trussed; the cylinder heads are cast from steel, with large oval openings for the inlet and exhaust and globular combustion chambers, all passages and piping being so planned as to offer easy curves and smooth surfaces to the gases. There are triple inlet valves and triple exhaust valves to each cylinder. The ignition system is double, by magneto and battery, with jump spark. Though probably the most expensive in both size and cost, this motor is typical of the French auto-boat engineering of the year, and of the present tendency of the sport.

The development in this country within the past two years has been in the same direction but far less rapid; there is, however, every reason to believe that when once under way the Yankee instinct to "lick all creation" will assert itself. The auto boat has rapidly come into prominence, and racing is the order of the day. The first departure from strictly conventional lines in engine building was made by the builders of the Standard motor, one of the best known of the old type, in the summer of 1903. To drive a new racing launch built for them they got out an entirely new design of engine, with open framework, light steel columns on a bed plate supporting six cylinders, cast in sets of three, the dimensions of each being 8 by 10 inches. A special feature of the motor is the use of compressed air from a tank, admitted by an extra set of valves, for either starting or reversing the engine, a single motion of a lever throwing off the air and throwing on the gas and electric ignition at will. The engine, which is rated nominally at 110 motorpower, weighs 3,200 pounds, or about 30 pounds per motorpower. The success of the *Standard* has led to the construction of a number of these motors for racing and for fast cruising launches, and the makers are now building regularly a still larger size, with six cylinders 12 by 14 inches.

Early in 1904 the Smith & Mabley Company, importers of French automobiles, started the construction of two high-speed auto-boat engines, one of 75 and one of 150 motorpower; all the work being done in their new shops in New York. The cylinders were uniformly 6½ inches diameter by 6½ inches stroke, the smaller motor having four and the larger eight. They were cast in pairs and mounted on a closed crank case, an aluminum casting. The weight of the motor proper without pumps, carbureter, commutator or reversing gear was but 1,600 pounds for the 150 motorpower and 950 pounds for the 75 motorpower. The former, in the 40-foot launch *Challenger*, though not wholly successful in its first season, has attained a speed of nearly 30 miles; the latter, in the *Vingt-et-Un II*, a few inches shorter, has made an enviable record, winning the match with the *FIAT*, many open races, and the match for the challenge cup of the American Power Boat Association, which she will defend this year. A duplicate of the larger engine is now installed in the new racing auto boat *Dixie*, owned by Mr. E. R. Thomas, a challenger for the Harmsworth cup.

Late in the season of 1904 there was launched another new racer, the *Onontio*, the hull designed by H. J. Gielow for Commodore H. B. Moore, of the Atlantic Yacht Club; the engine designed and built by James Craig, Jr. The Craig engine, built in various sizes, was one of the newer and lighter of the old type, in use in a number of launches and large auxiliaries; the new motor was an entire departure, a very light bed plate cast in manganese bronze on which were supported by light steel stanchions with diagonal bracing eight cylinders, each 7½ by 9 inches; the motorpower being 250, with a weight of 3,500 pounds. Launched too late for the racing, the *Onontio* made some fast trial runs, covering the mile in one case at a speed of 28 miles. A duplicate of this engine is now installed in the auto boat *Veritas*, just completed to the order of Mr. Alexander Stein, of New York, the hull also designed by Mr. Gielow.

The "auto marine" engine, as it may well be called, being either a remodeling of the marine type in the light of experience with automobile engines or an entirely new design based on the

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We anticipated and made preparations for the heavy demand during the winter months for our limousines, landaulets and victorias, and are thus able to make immediate deliveries of the famed White car with these types of bodies.

In order that you may appreciate the graceful and stylish lines on which these cars are constructed, and their luxuriousness of appointment and finish, we suggest that you call at our nearest branch or agency and inspect them carefully.

Remember that a record of five years of consistent achievement and success stands back of "the car for service."

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Note Its Strong Features:

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The 7-ft. slightly elliptical angle iron track.

The heavy brass revolving joint.

The artistic hangers supporting track.

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Made in five styles—prices from $20.00 to $100.00.

For keeping Motor cars spick and span, this device cannot be duplicated.

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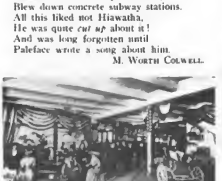
latest developments in car engineering, is now built by such leading establishments as The Gas Engine & Power Company and C. L. Seabury & Co., the Lozier Motor Company, and those already mentioned, while its influence is plainly visible in the work of the builders of smaller engines. To balance up fairly the good and bad that has come to the marine gasoline motor through the motor car would be an impossible task at this time. Undoubtedly the development has been pushed to a most undesirable extreme in many cases, but on the other hand lessons of the greatest value have been learned as to materials and methods, carburetion, ignition and other vexatious problems which were of slow solution under previous conditions.

The production of the perfect motor boat, whether for racing or cruising, must always rest with the naval architect and yacht designer, who decides upon the dimensions and form, the arrangement, the disposition of the engine, tanks, etc., and the correct distribution of all weights. This work, which is of the first importance, is entirely outside the province of the engine builder; a fact not generally recognized in the past nor even at the present time. Down to a very recent period the yacht designer has been seriously handicapped by the excessive weight of machinery in all classes of launches; through the skill of the engineer, this handicap has now been removed, and the reduction of size and weight of the entire power plant of a launch to limits hitherto deemed unattainable is only a matter of money.

HIAWATHA'S TOURING

FROM his lodge went Hiawatha,
Dressed for travel, armed for touring;
Dressed in buckskin coat and goggles,
Proudly planted in his auto,
On his head a French chauffeur cap;
At his sides, two calcium searchlights;
In his hand the wheel of ashwood;
At his foot the brake and honk-horn,
Rubber bulb-tube of the honk-horn.
Warning said the old Nokomyss,
"Go not forth, O Hiawatha,
Singing 'Navajo' and 'Tammany,'
To the realm of 'Contract Charlie,'
Lest the speed laws you exceed there,
Lest cops time you with the stop-watch!"
But the wise boy Hiawatha
Heeded not her woman's warning.
"*Chuff!*" The car went towards the forest,
Ev'ry minute one mile measured!—
Suddenly the sky above him
Seemed to strike the earth beneath him;
Things flung thro' the air around him;
Also smoke and fiery vapors,
As of burning Standard Oil tanks;
For his heart grew hot within him,
Like a hot spark-plug, his heart was.
Still he journeyed upward, upward,
Left the fleetest bird below him,
Left in quite a lively fashion!
Then *his* pieces started falling—
Parts came down in small installments,
Some to mountains, some to prairies,
Some to lands of crows and foxes;
Some to land of many contracts,
Blew down concrete subway stations.
All this liked not Hiawatha,
He was quite *out up* about it!
And was long forgotten until
Paleface wrote a song about him.

M. Worth Colwell.



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Price to introduce $2.25

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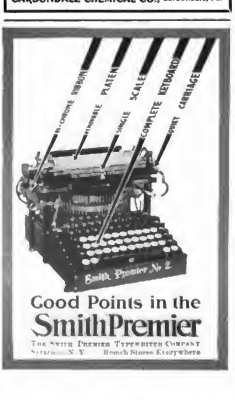
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Send for further information in regard to these goods before contracting for your 1906 requirements.

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We have prepared

a book of PROVEN FACTS about our new auto fuel "ENERGINE" we want to send it to YOU.

Every auto owner who reads this book will feel *conviction* in the lasting assurance of supremacy, expressed by those who *have* used ENERGINE.

Will you test ENERGINE if we will *prove* that it gives more power, at less cost—that it does not smudge the spark plug—that it is odorless, and *absolutely uniform?*

Will you give us an opportunity to prove these statements?

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IF you are a judge of good plugs so much the better, but if you are not it really does not matter, for you're only to try a "Never-Miss" to realize that



Never-Miss Spark Plugs

are the perfection of ignition Plugs Porcelain and Mica. They are the one plug that satisfies. They take and bring you back.

The 1906 Never-Miss (patent applied for) is the best. Any size, any car, any where, $1.50 and worth it. Coils, Battery Connections, and Chain Tools. Just got acquainted with Never-Miss; the acquaintance will be fascinating, you will like it. Battery Plugs, $1.00 per set; 2 in a box.

Fully guaranteed. Write today; the longer you wait the more good spark plug enjoyment do you Miss. See it, point?

NEVER-MISS SPARK PLUG CO.
LANSING, MICHIGAN



The Motorist whose car is equipped with the

WEED CHAIN TIRE GRIP

doesn't care a snap about snow or ice or mud or sand, or steepest hills. Safe, easy travel under all circumstances are assured to users of this ingenious device.

Easily applied; requires but little car room; and the cost very moderate considering the great advantage.

"As necessary as gasoline"

Weed Ch'n Tire Grip Co.
Office and Warehouse:
28 Monroe St., New York

HIGHEST QUALITY COMES ONLY FROM SPECIALISTS
We are Gasoline Motor Specialists



We excel because we make a specialty of one thing, and devote all of our time, energy, etc., to this one product, and as a consequence our motors are lighter, more powerful, more durable, more reliable and quieter than others. Watch our 1906 product.

Are You Interested?

If so our catalogue will enlighten you, and is yours for the asking.

THE KIRKHAM MOTOR MFG. CO. - BATH, N. Y.



WE make the most complete Folding Automobile Top on the market at prices from $45 up. We also manufacture Dust Shields, Slip Covers, Storm Curtains, Engine Aprons and Tire Covers.

Call and get our prices or send for booklet. 'Phone No. 3397 Orchard.

PARIS AUTO TOP CO.
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MIDGLEY
Artillery Pressed Steel Wheels
Carried in stock to fit Stanley Runabout and Touring Car, Oldsmobile and Autocar. We have special offer to Stanley Operators. Write for booklet.
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Better Be Safe than Sorry!
Reliable Ammeters and Voltmeters
Absolutely guaranteed. Give satisfaction.
Send for circular **$3.50 Each**
More-Power Co., Lowell, Mass.



The Mesinger Non-Skidding Tire Band
To be used on Wire Rands, Snaps and Side

Size	Price	Size	Price
30x3	$12.00	34x4	$16.00
32x3½	14.00	36x4	16.00
32x4	15.00		

H. & F. MESINGER MFG. CO., 1801-1807 First Ave., New York

ANTI-FREEZING SOLUTION

DURING freezing weather, in order to prevent the freezing of a water jacket on gasoline motors, it is customary to empty the water jacket over night or when the motor is not to be used for some time. Neglect to do this, it is needless to say, has often proved costly. Among the most popular preventives to obviate the cylinder jacket bursting by the water freezing is that of the use of calcium chloride. This chemical is colorless and, unlike salt, will not rust or corrode metal of any kind. It dissolves very readily in water, and, being a great absorbent of water, does not evaporate. Calcium chloride is sold in sheet-iron drums of about 700 pounds each. It is poured into the drum in a liquid state, which hardens into a stony substance, which is afterwards broken up before dissolving it by means of pounding the drums in the side with a sledge hammer. Calcium chloride's freezing point is many degrees below that of salt. Salt brine freezes at zero, while calcium brine has a maximum freezing point of 54 degrees below zero Fahr. Three pounds of calcium chloride dissolved in a gallon of water increases the volume 20 per cent, and the less dense a solution is the more it will absorb, so that calcium chloride really increases the cooling capacity of the radiator. Salt and calcium chloride must not, however, be confounded. Prof. Eugene T. Shinkle, the well-known chemist, says that he made a test of calcium chloride to determine if it would have any action on aluminum. He stated that some of the motor car manufacturers claim that a solution of calcium chloride in the water jackets of their machines have a deleterious effect upon aluminum fittings used in the connection. From a sample of calcium chloride he made a saturated solution in distilled water and filled a gas Burette with the solution, and under the Burette placed an ordinary tin bucket. In this bucket stood up a bar of aluminum 6 inches long by ¼ inch wide by ¼ inch thick. He adjusted the glass cock on the Burette so that the solution would drip down onto the bar of aluminum at the rate of about one drop of solution per minute, thus exposing the metal to the action of the solution exposed to atmospheric effect, the lower end of the bar being submerged in the solution caught in the tin pail. This experiment lasted over a week and the solution has been tried under various conditions of temperature without any apparent effect upon the condition of the metal. He is thoroughly convinced that calcium chloride will not have any deleterious effect upon aluminum or upon any other metals used in the construction of motor cars.

If a saturated solution of calcium chloride were used in the water jackets of a motor car the heat generated in the cylinders would cause an evaporation of the water, leaving an excess of calcium in the remaining solution, which would precipitate the crystals on the cylinder and in the pipes, but the addition of sufficient water to bring up the level to its normal condition would again dissolve the calcium chloride and leave the cylinders and pipes perfectly free from any deposit of the salts.

A STEEL-armored ignition cable has just been patented by Herz & Co., which consists of several layers of rubber alternating with a new compound which is kept secret, the whole covered on the outside with a strong armor of steel which protects the cable against injury, but does not interfere with its flexibility. The outer steel armor is brought into conducting connection with the current ground. The enormous advantage of this new invention manifests itself in an increase of 100 per cent. of the spark in the spark plug, really doubling its efficiency. The use of this cable for the primary circuit makes the sparks in the circuit breaker disappear absolutely. The cable is sold only cut to the various lengths required and outfitted with special terminals; the whole ready to be hooked to the motor.

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NEW YORK AGENT FOR
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142 West 38th Street, New York City

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AUTO TOP MATERIALS
We are headquarters for water-proof materials of all kinds and make a specialty of materials used in the manufacture of Auto Tops, Storm Curtains, Slip Covers, etc
Write for Samples and Price List

L. J. MUTTY CO., Boston, Mass.

NEW TIRE CASE



Quickest to adjust, easiest to put on, cheapest to use. Will fit any size tire.
We furnish the common style with lace fastening if desired.
Lamps and auto covers, tool rolls, leggings and other auto fabric supplies.
Manufactured exclusively by
The WM. B. WILEY & SON CO.
Box 81, Hartford, Conn.

Aluminum Bodies
SPRINGFIELD-TOPS
Springfield Metal Body Co.
376 Bernia Avenue, Brightwood
Springfield, Mass.
1, 4 and 5 Bow Tops and Attachments for all cars



THE YANKEE SILENT MUFFLER (Pat'd)



Parts all stuff fires has room the shot expand to 4 times the size of the explosion. A vacuum is created between the exhaust valves and the muffler, which draws the gases from the cylinder, and back-pressure is overcome to a great extent. More power guaranteed. Radiator so great that the muffler keeps cool. Made to fit all makes of cars. Send for catalogue and price. B. K. Smith & Co., Elkins, N. Y., U. S. A.



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FULLY GUARANTEED

THE "ULTRA" COMPOUND PUMP
TWO PUMPS IN ONE
Easiest to Operate
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Ultra Pump & Power Co.
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Odometers



The Whitlock Cooler
IS THE STANDARD
Manufactured By
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HARTFORD, CONN.
Radiators and Coolers of Every Description



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Send a dollar for it.
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WE have issued a book of testimonials and endorsements concerning the STEVENS-DURYEA CAR. *Our satisfied customers do the talking for us.*

The communications from pleased patrons of the Stevens-Duryea are so interesting, so informative and emphatic, that we commend their perusal *to all intending purchasers*. Present owners, too, will be favorably impressed with the "certificates of quality" relative to *their car*. Securing a STEVENS-DURYEA is a wise, discriminating and most sagacious choice. Send for "What They Say About Us."

J. Stevens Arms and Tool Co.

712 Main Street

CHICOPEE FALLS, MASS., U. S. A.

Members Association Licensed Automobile Manufacturers.

STEVENS-DURYEA

Four-Cylinder, Twenty-Horsepower

TOURING CAR

PRICE, $2,500

WE have prepared "A Book—" XXth Century Hustler"—not as a catalogue, but to elucidate some of the points about which we receive most questions.

We believe that in a short time the man who buys a car, whether it be a $6,000 or $600, will insist upon being informed in detail on everything about the machine he is getting.

Our book does not weary you with specious platitudes—it is a book of facts, with a logical reason given for everything it describes. Some of the descriptions may be unconventional, but conventionality has too long been allowed to stand in the way of information.

Our book is a recognition of the right of the purchaser to know what he gets for his money. *Send for this book.*



MODEL D

STODDARD-DAYTON

Represents a big, powerful power plant mechanically installed in a running gear, connected to a *clutch drive rear axle*, by means of a *good cone clutch, sliding gear transmission, and bevel gears*, controlled positively and few movements; the whole surmounted with a five-passenger body, all made of the *best material*, by skilled mechanics, with modern machinery. This, as a whole, is the *1906 Model D Stoddard-Dayton.*

4-cylinder, 4½ x 5
Sliding Gear Transmission
Selective Type Control
Clutch Drive Axle



30-35 H. P.
2,100 pounds
$2,250.00

A combination of *Power, Speed, Control, Construction* and *Material* makes a proposition unexcelled.

DAYTON MOTOR CAR COMPANY, Factories, DAYTON, OHIO

AGENCIES—Chicago, McDuffee Auto Co. New York, Stoddard-Dayton Agency, 61st Street and Broadway. Minneapolis, Haynes Auto Co. Boston, Randlff Motor Car Co. Indianapolis, Fisher Auto Co. Omaha, Dwright Auto Co.

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Motor Cars

Buying a high-grade automobile cannot safely be done on the strength of the mere arguments a manufacturer has room to advance in his advertisements.

Not even the detailed explanations and reasonings of a good catalogue are sufficient proof—you are entitled to an actual examination and explanation of the car's construction and operation, and a thorough-testing ride in it.

We will be pleased to send you our catalogue on request—and you will find it tells of many features found in no other car.

But, better still, we will give you a personal letter of introduction to a Peerless dealer near you. You can use it at your leisure, and can be assured of a Peerless explanation—and a Peerless ride—that you cannot afford to miss in justice to yourself if you mean to purchase a high-grade automobile.

1906 Catalogue Ready

THE PEERLESS MOTOR CAR CO., 43 Lisbon St., Cleveland, O.

DELAUNAY BELLEVILLE AUTOMOBILE

FAWKES TIRES
Remember! *No pumping No puncturing*
Write to-day for our free booklet and full particulars
Milwaukee Rubber Works Co., Cudahy, Wisconsin
Dept. W. (Suburb of Milwaukee)

Yankee Grade Meter
Price $7.50
Guaranteed to correctly measure the grade of any hill from 3 to 40%, can be read from back seat. Guaranteed for one year.
Manufactured by
E. J. WILLIS CO.
6 Park Place, New York

We Are Ignition Specialists
If you have any trouble with your ignition, write to us and we will tell you just what to do. Our **Apple Automatic Sparker** gives a strong, steady current that never fails. No trouble to put on any car or engine, no fuss or bother to keep in order. Every dealer who sells a gasoline car has an Apple electrical equipment. For full information write THE DAYTON ELECTRICAL MFG. CO., 100 Boyer Bldg., Dayton, O.
THE Apple Automatic Sparker

TOPS BODIES
LATEST STYLES & PRICES ON APPLICATION
DETROIT MOTOR CAR SUPPLY CO.
DETROIT, MICH.

BRYANT RIM FOR AUTOMOBILES
Tire removed in thirty seconds.
Replaced in same time.
Advertised in leading magazines.
Sales easily made and every tire guaranteed.
Money refunded after 30 days if not satisfactory.
We want every dealer to become a BRYANT agent.
Ask about it.
THE BRYANT STEEL WHEEL AND RIM CO.
452 Hayden Bank Bldg. COLUMBUS, OHIO

MOTOR CAR LUBRICANTS

(Continued from page 62.)

products give on the whole better results than light oil, and are used to some extent.

The lighter gravities of non-fluid oil, although apparently as heavy as the gear-case oil above referred to, are much less viscous, and consequently absorb less power in the transmission, at the same time, protecting the gears by cushioning the shocks of changing speed. Being little affected by extremes of temperature, they can be used at all seasons of the year.

The foregoing remarks concerning sliding-gear transmissions apply also to the individual-clutch and planetary styles. As in these latter types all the gears are constantly in mesh, the wear of the teeth is much less, and what is needed is merely an oil which will distribute readily in all weathers, and not leak from the casings.

Oiling the crank-pins by splash from the crank-case still seems the simplest and most dependable method. The use of grease cups on the main bearings tends to prevent the splashed oil from working out through them. The differential gear is usually packed with grease or a heavy non-fluid oil, except when its case is made integral with that of the transmission, in which event it is oiled from the latter. The use of non-fluid oil or a grease in the axle bearings is advisable, as fluid oil, which is injurious to rubber, runs down the spokes on to the tires.

Motor-car driving chains rarely receive the attention which is necessary to prevent undue wear. They are more exposed to dust and grit than any other wearing parts, and mere superficial application of lubricant does not reach the roller studs, on which the most wear comes. The chains should be taken off several times each season, and, after being soaked in kerosene over night, and wiped clean, should be immersed for half an hour in a melted mixture of about eight pounds of tallow, two pounds of flake graphite, and one quart of cylinder oil. After allowing them to drain, when they are replaced in position, apply a coating of dry graphite to the outer surfaces.

The time when lubrication was considered an unimportant detail—the last thing to be attended to when all else had been provided for—has passed, never to return. It has come to be recognized by every manufacturer as an essential feature of motor-car design and construction. And if these few suggestions serve to impress upon the reader that no detail of the maintenance of a car will so well repay proper care, both in increase of power and greater length of life, they will not have been written in vain.

WHY SIMILAR TIRES DETERIORATE UNEQUALLY

THE lives of similar tires, on similar cars, using the same kind of roads, doing the same class of work, but belonging to different owners, vary considerably. The cause, mostly, will be found to be inequality of pressure or irregularity of inflation, or because one wheel has been called upon to do more work than another, or the burden ask not been adapted to the size of the tires, resulting in excessive distention of the rubber and fabric and the generation of heat. S. F. Edge has been giving minute attention to this subject and has arrived at the conclusion that the weight respectively on the front wheels and on the rear wheels will require to be varied according to the make of the tire. Some tires will work admirably with the same weight on the front as on the back wheels, whilst others require the front wheels to carry up to twenty per cent. less than the rear wheels. His figures for Michelin and Continental tires work out nearly alike. For instance, the Michelins' proper pressure, according to Mr. Edge, on large cars, for the front and rear wheels is 70 to 80 pounds per square inch; the Continentals' proper pressure on the front wheels is 75 pounds to the square inch, and on the back wheels 80 pounds.

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THE DAIMLER MANUFACTURING CO.

ANNOUNCES THAT IT IS NOW READY
TO BOOK ORDERS FOR THE

1906 AMERICAN MERCEDES

Price, $7,500 40-45 H. P. Price, $7,500

Through our sole ownership for the United States and Canada of all patents, designs and shop drawings of our parent company—THE DAIMLER MOTOREN GESSELSCHAFT, of Unterturkheim, near Canstatt, Germany, we produce the only authorized copy, part for part, of the

1906 MERCEDES

AUTOMOBILE

All the shop drawings of the 1906 Mercedes, showing the latest changes and advances embodied in this celebrated car, are now in our hands, awaiting your examination. Will mail you the 1906 catalogue on request.

SAVE THE DUTY

DAIMLER MANUFACTURING CO.
967 Steinway Avenue Long Island City, N. Y.
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Stanhope

Baker Electrics

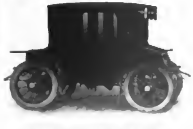
embody every possible good feature required to make them what they are so frequently called—



Depot Wagon

The Aristocrats of Motordom

Every particle of material used is the best that money can buy. The workmanship is perfect, the upholstery and exterior finish superb. All wearing parts are equipped with ball bearings, reducing friction to the minimum, and insuring smooth easy running cars. The perfect mechanical construction of *Baker Electrics* enables us to use fewer battery cells than any other electric vehicle, at the same time securing greater efficiency and lowering the cost of maintenance. Their beauty of finish, quiet running qualities and simplicity of operation make *Baker Electrics* ideal for town use.



Inside Driven Brougham

We desire agents in a few important cities not yet covered. Write for particulars.

Imperials Stanhopes Surreys
Depot Wagons Broughams

THE BAKER MOTOR VEHICLE CO.
14 JESSIE ST., CLEVELAND, OHIO



Outside Driven Brougham

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THE
AUTOMOBILE
EQUIPMENT CO.

Our 4 Bow Extension Top for $75.00, complete and ready to attach, crated f. o. b. Detroit, is guaranteed to fit better, wear better, look better than any Top sold heretofore for$ 125.00. Order now before the rush for 1906 begins.

Send for our illustrated catalogue of Tops, Rain Aprons, Drip or Mud Aprons, Chain Boots, Wind Shields, Searchlights, Oil Lamps, Imported Horns, Goggles, Special Auto Clothing, Coils, Batteries, Plugs, Carbureters; EVERYTHING that may be called a Motor Car Accessory.

We do not carry just one kind of each accessory, but all kinds (that have any merit) of all accessories. In buying choose from the largest and most carefully selected stock in America. Write for our latest prices.

THE AUTOMOBILE EQUIPMENT CO.
253 JEFFERSON AVE., DETROIT, MICH.

THE HIT OF THE SEASON
GABRIEL HORNS
work with foot lever from exhaust. Let us furnish you with estimate on Cape Top and Slip Covers.
Auto Cover and Top M'f'g Co., Inc.
Telephone, 4734 Columbus. 148 W. 86th St., N.Y.

We furnish outfits for rebuilding
Model "A" CADILLAC
(like cut) and
FORD
Change can be made in one day. Send for photo and booklet.
Rebuilt Model "A" CADILLAC.
AUTO RE-BUILDING CO., 1130 College Ave., Indianapolis, Ind

Auto Screw Jack
Powerful Baichel Double-Acting Screw Jack
Easy to Operate Quickly Adjusted

No.	Weight Each	Lifting Capacity	Adjustment
501	6 lbs.	3,000 lbs.	12 to 17 in.
502	8 lbs.	4,000 lbs.	13 to 19 in.
503	12 lbs.	6,000 lbs.	14¾ to 23¾ in.

COVERT MFG. CO., - - Troy, N. Y.

WATERLESS KNOX
Pleasure and Commercial Cars
GEO. A. CRANE, Manager
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ROBERT VOLT AMMETER
For Testing Batteries
GUARANTEED
Sample, including leather case, prepaid on receipt of $8.00
2 Volts
30 Amperes
Send for Catalog.
The ROBERT INSTRUMENT CO.
65 SHELBY STREET, DETROIT, MICH.

As an Efficient Fire Class Spark Coil
The "DOW"
Has no Equal
For further information write to
THE DOW PORTABLE ELECTRIC CO.
Braintree, Mass., U. S. A.

A SILENT MUFFLER

IT has been the aim of a good many motor-car and boat people to get a muffler which would be noiseless and absolutely without back pressure. While these conditions were considered ideal, they were also thought to be impossible.

The Weiss muffler seems to have solved the problem.

The muffler in question is an expansion chamber of about five times the cubic contents of one of the cylinders of the motor, into which chamber the motor exhausts. This chamber is equipped with a valve to the atmosphere, which is opened and closed in time with the engine or motor, so that it is closed when the exhaust port of each cylinder opens, and the instantaneous delivery of the products of combustion from the cylinder into the expansion chamber takes place. This last-named occurrence produces the pistol-shot-like noise which one hears when a gasoline motor exhausts into the atmosphere unobstructed or through the cut-out of a muffler.

Just at that time, as stated, the valve from the expansion chamber into the air is closed, and the noise is prevented. Immediately thereafter the valve opens, and is fully open when the piston is traveling fastest, and expelling the foul gases from the cylinder freely and unobstructed through the expansion chamber into the atmosphere.

The advantages of such an arrangement are not only those of a noiseless muffler, and of the power saved by having no back pressure, but are numerous otherwise;

First, of having cleaner parts, because the particles of carbon, soot, etc., are delivered free and will not stick and settle on the cylinder walls, pistons, valves, etc., which helps to destroy the motor;

Second, by freely exhausting the products of combustion, the new mixture will be cleaner and will not be fouled by the burned substances which partly remain in the cylinder under pressure when muffling the sound in the old way by squeezing the exhaust through small openings or crevices. Whatever gases are left will expand in proportion to their pressure, and the pressure varies with the work the motor does and the speed at which it runs. The expanding gases prevent a proper mixture, and the motor will miss firing, and if it does fire, it will not develop the power it ought to and which it will if the mixture is good. The missing of explosions is very often due to the above-mentioned cause, but is generally laid to the carburetor or batteries. No matter how good the mixture is, if it is fouled after, or is prevented from entering the cylinder because the latter is partly filled with burned gases, the batteries cannot be expected to fire the mixture.

In the ordinary muffler there is, besides the noise, back pressure, dirt, etc., still a very objectionable fixture to those gases which cause all the trouble. They are red hot, and the best way to get some of that heat and as much of it as possible is to keep them under pressure. But since the idea is to keep motors cool so that lubricating oils do not burn, etc., the Weiss muffler, therefore, opens a hole of about twice the area of the exhaust pipe and lets gases, heat, dirt, and back pressure out.

ONE of the results shown by the French trials for a place on the Bennett team was interesting. There were twenty-four cars entered; of these, fifteen were able to complete the course. Twenty were equipped with Hess-Bright (1IB) (original D. W. F.) bearings. Of the fifteen that were able to complete the circuit fourteen were so equipped. All three of the car builders selected to carry the French standard pinned their faith to these bearings, as did also the makers of the two cars selected as possible substitutes.

The only maker that had once used these bearings and had dropped them, only succeeded in getting over the course with one car out of his four entries; whereas he had in a previous year on Hess-Bright (D. W. F.) bearings taken the cup, but, without them, lost even the chance of a try.

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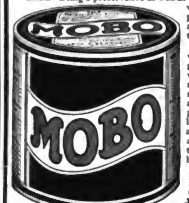
The Care *of the* Car

Washing the body of the machine, keeping the polished surface free from lubricator, road dust and gutter muck is just as essential to the life of an Automobile, as is the attention given the running gear.

Mobo, the new cleanser for Automobiles, will easily and quickly remove grease, dirt and grime and all traces of a hard run, without dulling or scratching the highly polished surface,

MOBO

is unlike common soap, as it positively contains no free alkali. Being a preservative as well as a cleanser, it prevents varnish or paint from peeling or cracking, and adds a fine gloss to the surface.



Mobo may be used with profit on leather goods, harness or woolen fabrics. Cannot harm the most sensitive skin, as it is a purely vegetable oil preparation and absolutely contains no free alkali. Put up in 2-lb. and 8-lb. cans; also in tube, half barrels and barrels.

If your supply man does not keep *Mobo*, send us his name and address, and we will see your wants are supplied.

JOHN T. STANLEY
New York.

MOSLER



Spit Fire

Actually Spits Fire while others spark only

Energetic Ignition Greater Power

Ask any user—A Trial is conclusive

TIMERS and SECONDARY DISTRIBUTERS

Run in oil in either direction. Not affected by engine speed. Self adjusting. Multiple cylinders set as easily as one.

Write now for 1906 Booklet of Ignition Outfits

All Goods Guaranteed







The Mosler Transparent Dash Board Ignition Outfit

Timer and Distributer

A. R. MOSLER, 1679 Broadway, New York

COOLERS FENDERS



HOODS EASTERN FACTORY, NEWARK, N. J. TANKS

BRISCOE MFG CO

MAKERS OF

SHEET METAL PARTS

—FOR—

AUTOMOBILES

Our two large plants are ready to take care of our rapidly increasing business. We can not only promise, but make deliveries.

During the past season we sold 12,045 radiators to 12 bona fide motor car manufacturers, among whom are nearly all of those who have produced high-grade and successful cars.

Over 30,000

BRISCOE RADIATORS

are now cooling automobile engines

We make both Honey-comb and Tubular

Iron and Aluminum — **RADIATORS**

Sheet Metal — **HOODS and FENDERS**

Sheet Metal — **DASHES and SEATS**

Galvanized Iron and Copper — **GASOLENE and WATER TANKS**

Sheet Metal — **RUNABOUT BODIES**

Write to our nearest office for estimates and get in line for 1906

BRISCOE MFG CO.

Detroit, Mich., and Newark, N. J.

The "Valveless Wonder" for Automobile Lubrication

WE offer to the automobile trade a mechanical lubricator without valves, stuffing boxes or springs. The only pump on the market which will pump against any pressure whatever. Manufactured in any number of feeds and readily adapted to any automobile on the market. No sight feeds are necessary, but where parties want them we are prepared to furnish them.

¶ Write for circulars.

Madison-Kipp Lubricator Co.

Madison, Wis., U. S. A.

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THE MARMON

"A Mechanical Masterpiece"



Front wheel and opposite rear wheel each raised over a foot

Takes the Jolts Out of Rough Roads

Have you ever taken a long ride in an automobile?

At the end of the run were you shaken, jolted, vibrated until you were nearly exhausted?

If so, wouldn't you appreciate a car that would carry you any distance over any kind of road, through ruts, over rocks and bumps, with the easy, gentle sway of a sailboat, and still go at good speed?

It is safe to say that nobody ever rode in a Marmon over a rough road without realizing that its positive luxury of motion is not only unequaled, but absolutely unknown in other cars, regardless of price or prestige.

The picture shows why.

All roads present this condition in small or large degree—here a bump and there a rut, often forcing one wheel to ride through a depression while a wheel on the opposite side passes over an elevation. Unless the automobile possesses flexibility to meet these varying conditions, it means constant, ruinous strain for the mechanism and constant reaction upon the passengers, varying from vibration to jolting.

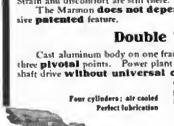
Other cars are constructed on much the same rigid principle as a farm wagon. In the farm wagon, comfort is not considered, nor is there any expensive mechanism to protect. This the automobile has attempted to remedy with springs of various types. But the **unnatural principle** is still there. Strain and discomfort are still there.

The Marmon **does not depend** upon its excellent springs for elasticity. It possesses an exclusive **patented** feature.

Double Three-Point Suspension

Cast aluminum body on one frame, power plant on another frame, **each frame** suspended on three **pivotal** points. Power plant and rear axle are practically a unit, always in alignment. Rigid shaft drive **without universal couplings.** Wheels adjust themselves to the roughest road condition. This elimination of binding and twisting strains means perfect power transmission, greater efficiency with **less wear** for all parts, tires included.

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Perfect lubrication

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In glass jars, wooden case, for marine use. Price, $7.50.

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"GALLIA" ELECTRIC CARRIAGES

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NEW YORK CITY

MOTORING IN HAWAII

(Continued from page 50)

Park, with its landscape gardening and winding driveways, past limpid streams and lily ponds. The park ends at the foot of Diamond Head, the great extinct crater, which is to Hawaiians what Fujiyama is to the Japanese. Passing the racetrack and polo field, we speed around the foot of this wonderful volcano of ancient days, and come back to town by way of Camp McKinley, our coast artillery garrison.

Our third spin is to Moanalua, the estate belonging to a private individual but open to the public, where tea is served in a Japanese tea-house every Saturday afternoon. Here is a fine golf course and polo field surrounded by a natural amphitheater, where teams from the other islands compete each year.

Punchbowl, another extinct crater, five hundred feet in height, commands a fine view of Honolulu and the harbor, and is reached by two roads. One leads from the back of the town, and the other through the picturesque Portuguese settlement, with its grape vineyards on all sides.

Mount Tantalus, the tallest peak on the island, over two thousand feet high, is a most interesting trip through the eucalyptus tree forest, and past the camps belonging to Honolulu people, where they go for week-end parties.

The longest ride, which would take two or three days from Honolulu, starts us over the Pali, down into the valleys beyond, past rice fields, banana, pineapple, and sugar plantations and ranches belonging to wealthy Honolulu people. There are houses along the way all around the coast where one can stop and obtain Hawaiian food and see more of native manners and life than is obtainable in town.

In this trip around the Island of Oahu one almost gets back to primitive days when the old native huts of straw existed, and the Hawaiian people subsisted mainly on *poi* made from taro root, danced the *hula*, and sang *meles*.

Finally, just before we get back to Honolulu, we stop at Pearl Harbor, the new Pacific Naval Station of the United States Government, which is the finest land-locked haven of the world, and where the whole American navy could safely ride at anchor, protected from the sea.

AN AVOIDABLE NUISANCE—NOXIOUS VAPORS

EXCEPT temporarily, there is no excuse for allowing smoke to pour from the exhaust pipe, and there ought to be some other place for the pipe than in such a position that it exhausts directly behind the car, so that when a stoppage occurs in traffic the exhaust is blown directly upon those immediately behind, whether horse carriages, pedestrians or motor cars, and a driver should always see to it, on leaving the garage, that superfluous oil has been blown off before going into the streets. Nothing is so common, at all hours of the day and night, for the most crowded thoroughfares and the most beautiful scenic roads, to be made filthily noxious by negligence, or worse, indifference. The Automobile Club of Great Britain and Ireland has taken the subject under their superintendence and has spotters out in all directions to report, so that members may be reminded of their duty. One motorist was recently fined, under an old act governing the public parks, for emitting "smoke," and a second "visible vapor." It would add another terror to the motorist's life to have such a provision converted into a general law, to avoid which, and in the cause of common sense and decency, motorists should be careful, especially in controllable matters. A trail of blue, foul-smelling vapor is provocative of another kind of "blue streak," which need not be specified. There is no conceivable mechanical reason for but little smoke coming from the exhaust and that little should exist only under rare circumstances.

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THE DAVIS (PAT. LAP) ROBE OF COMFORT



A Merry Christmas

Is Absolutely Cold, Wind and Water-Tight

GET INTO IT

It cannot jar loose. It will not interfere with the operation of your brake or levers. It prohibits the entrance of cold or exit of the heat of the body. It can be put on or off instantly. It "never moves" while you sit, but falls at your feet when you stand.

It Will Keep You Warm and Dry

in any degree of cold—all day long.

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1st. When cash is sent with order, we prepay express charges.
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3rd. We send on approval to responsible people and pay return charges if not satisfactory.

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For the Man at the Wheel

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An Ideal Material for Automobiles and Motor Boats

FOR SEATINGS.—Pantasote Leather wears better than the natural hide; it contains no oils to dry out, and is impervious to weather; will not crack, peel or chip.

FOR CANOPY AND CAPE TOPS.—Pantasote Top Materials give a handsome finish to the car, are more durable than the real hide, absolutely water-, stain- and grease-proof, and vastly superior to the various rubber and inferior imitations of leather—as Pantasote always remains soft and pliable, and is

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A NECESSARY GARAGE CONVENIENCE

It is a simple matter to lift a motor from a machine with this hoist

AND JUST AS EASY

To hoist one end of an automobile several feet from the floor, thus making the parts under the car accessible and avoiding the use of a dark and dirty pit.



A GREAT ADVANTAGE

Is the compactness of this hoist. While it takes practically no room, any weight up to 3,000 lbs. can be lifted with ease.

AS THE ILLUSTRATION SHOWS

It can be rolled to any part of a garage or factory and one man can operate it. We solicit a thorough investigation of the merits of this crane.

OUR NEW DISCOUNTS MAY INTEREST YOU

Write for illustrated booklet for all the facts about this crane

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MOTOR CARS
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Model "G"—10 H. P. Runabout

"Nuff Sed"

When You've Got

SIMPLICITY
—AND—
ACCESSIBILITY

WOLVERINE "G"

HAS THE ABOVE

Two-cycle motor under hood. Bevel Gear Drive. ONE LEVER CONTROLS all speeds and reverse.

LIST, $650.00

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Agents Wanted *Address Dept. "E"*

WINTER MOTORING

(Continued from page 98.)

Prince kindly looked out for my camera, a Graflex, while swearing it and I were nuisances together, and I had the other swaddled lovingly up in lap-robes between my knees, and neither came to harm.

The pictures can give you a better idea of the country and roads than I can. The former is gently rolling and beautiful—wide, sweeping fields, snow-covered now; in summer, fair and green and yellow, the usual hedge or wire fence being distinctive from the split rails of Virginia and the comfortable, well - built bridges, each with its accessory ford for heavy teams and the accommodation of thirsty horses —quite different from the conspicuous absence of all save the most necessary structures in the F. F. V. State, the roads of which I have already spoken of at length in these columns.

"Hills?" There is nothing but hilly country from Washington to Baltimore; you either go up or you go down—there is no level mid and in-between. And now to tell the tale of one of the records we made, and one of which Royce is justly proud, and the car is proud of it, I dare say, if, indeed, as some would have us believe, machines have souls. From Washington to Baltimore and return, we never traveled—up hill or down—except upon the high speed. Never before, to the knowledge of any autoist in Washington, has Sandy Hill been climbed except on the second or first speeds, and in summer the farmers take turns standing with a team at the foot of the mile-long hill, hauling exhausted automobiles to the top at three dollars per haul. But not only did we use only the high speed (except, of course, for starting, and to pull ourselves out of a ditch where an unheeded driver had forced us), but it was at no crawling, breathless, straining pace that we mounted some of the steep grades, but at a good fast clip, so much so that we made record time coming home—of which more anon.

After a few more stops for pictures—and note the character of the roads, please, which they show—we arrived in Laurel, where we ate ravenously of absolutely the worst meal which a man could put on a table, charge thirty-five cents for and not faint from shame! Don't stop at that hotel (see picture); pick out some other one—it might be better and couldn't be worse, so you can't lose. But it tasted good, just the same, and although I did choke over the apology for coffee, and was invited to go outside and die by the Prince, who protested my spluttering annoyed him, I can look back with pleasure even on that meal, and be glad it wasn't worse. There was the flask, too, and the solace of the cigarette, and then—more fixing of anti-skids which didn't help a bit, and one more picture, and then ho! for Baltimore!

I have said little thus far of the weather, principally because its stinging cold but added to the enjoyment. If the editor will show you the picture of me which Royce took, you will see why I, personally, minded not any wind we could raise. Over a flannel shirt and a vest I wore a sweater—the collar of which is pulled over my head, previously covered with a wool skating cap. It is the prospector's substitute for the mackinaw dance, and served me well in Alaska at a temperature of thirty-five and more below. Of course, over the whole I had a heavy coat, needful to keep the warm air in and take the snow and water, but except for my nose and toes, I was not cold the entire trip.

Incidents of the trip were many, but small. Several times, in breasting the top of a hill and speeding down the other side the car dropped away and left us seated in the air—a queer sensation. Once or twice we had to stop to let a frightened man lead his perfectly calm horse by the Unknown Terror, and of one of these passages I have a record—which, from the horse's standpoint, might be called "The Terror Coming" and "The Terror Passed." Then there were stops for a nip—for it was very cold, even for well-wrapped-up motorists, and chaff and skylarking and the usual good time which prevails when four hard-working men get loose for a real good time, and find

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THE AUTO-METER for your new 1906 car



will tell **how fast** it can travel, **how far** it travels **on a trip, how far in a season.**

This information will be accurate and will help to determine positively

SPEED and DISTANCE

enabling you to get a line on the car.

Then there's the pleasure of it. Thousands of automobilists all over the country use the Auto-Meter and thousands more will use it next year. It has become an indispensable adjunct to a car.

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It is blown by the exhaust, operated by foot-pedal, and gives a deep, rich, musical tone. Being made of finely polished brass, small and compact in size, with no soldered parts to melt or jar loose, it is an ornament to any car.



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DEAD-BEAT

ACCURACY GUARANTEED

Volt Ammeters, 0-3 Volt, 0-30 Amp. Price, $1.00. Voltmeters, 0-3 Volt. Price, $1.00. Ammeters, 0-30 Amp. Price, $1.00. Postage prepaid. Send for Price List.

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STORM APRONS

Runabout size, two openings			$ 7.50
Tonneau	" four	"	11.00
Touring Car	" five	"	13.50
Capes	one	"	2.00

Our Storm Aprons are made of heavy weight rubber cloth with plaid back. Prices include fastenings for attaching to any machine

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Send us the size you need and we will quote you a low price

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it in such a healthy way as rushing swiftly along a cold road in one of the substitutes for wings which modern civilization has afforded them.

In justice to Royce, I must say a word for his ability as a driver. I have pictured him rushing us along at breakneck speed and making light of rough roads, but any construction put on this that he is reckless is wrong. Nervy, not nervous; daring, not reckless; keen and experienced, with a nervous reaction like a streak of light and a knowledge of the car as profound as it is accurate, no better driver could be asked for; and even when we were forced into the ditch, when a negro driver, half asleep, tried to drive on both sides of the road at once, those in the rear seat never stopped their conversation. No better tribute to their faith could be asked.

Baltimore was reached at last, a hurried stop made in the fire district to take a picture, lest the unconvinced assert we did not make the trip—then a visit to a garage for gasoline and a wash-down for the ice-envered lenses of the lamps, and we were off again for Washington. It is now too dark for more pictures, so we let loose and try to see what time we can make it in. Most of the run is made in darkness, lighted by the searchlights, to be sure, but they make the slightest rise and the worst rut look about alike, and yet, when we roll into Washington, and take out the time caused by the solitary stop we made for repairs—some troublesome adjustment of the generator for the acetylene lights—we find that two hours and five minutes only have elapsed since we left the miskirts of Baltimore, certainly fine time for a forty-five mile run, at night, and with rutted roads so badly frozen as to compel considerable application of the brakes at every turn, lest a dangerous skid pile us in a ditch from which no crawling low speed can extricate us.

During the last hour a fine, small sleet swept us in the face, and when we stiffly moved from cramped sitting it was to find a thick coat of ice covering each coat and hat.

I have taken the individual opinion of a lot of men about such a run, not telling them that I made it. "Hardly, at this time of year," "Not for me," "Wish you joy if you make it," "Bet you never get there," etc., were the comments. Then I showed the pictures, told the story, and then "Gee! I *wish* I had been along!" was the almost invariable reply. I tell you, gentle reader, he who owns a car and does not take it out in foul weather as in fair, in rain and storm and sleet and cold, misses half the joy his machine can show. To rough it hard, to feel the keen, cutting wind in one's face, to exult in the speed over roads on which the horse-cart must crawl, to know that you, at least, are not hide-bound with conventional restrictions, and to feel that your car is equal to anything you may ask of it—that is sport indeed—sport in its finest sense. And if you can, as we did, make a record for the speed you use, the time you make, and the hill you climbed, you may well conclude your winter run is the finest of your series of motoring recollections.

COMPARATIVE CONSUMPTIONS

THE following quantities were supplied by a prominent firm of Continental engineers, who have had unequalled experimental experience in these matters. The following consumptions per motorpower hour represent fair average quantities for medium powered motors working at full normal load. For internal combustion motors 1 h.m.p. hour developed needs .9 pint gasoline, .9 pint paraffin, 1.8 pint pure alcohol, one lb. coal, .95 lb. coke, and about .9 lb. anthracite, the last three being burnt in a suction gas producer. A good compound condensing steam engine would consume about from 3.3 to 4.5 lbs. coal per m.p. hour, while a simple expansion non-condensing engine would need from 4.5 to 7 lbs. of coal also per m.p. hour. With these data comparisons of running cost can be instituted easily once the power and fuel cost are known.

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¶ The Automobilist who to-day doesn't include a Jones Speedometer in his list of accessories is eliminating two-thirds of the pleasure of automobiling—and is encouraging the officer of the law to make his arrest.



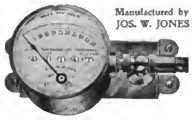


¶ When the Judge says: "Did you have any *positive* means of determining the speed at which you were traveling?"—he is asking if your car was equipped with a Jones Speedometer. Don't forget that!

¶ The Mounted Officer with his primitive stop-watch method of timing the automobilist can seldom make a case. Guess work testimony doesn't go in court. The officer means well, but his method is wrong.



¶ Our Speedometer Bulletin contains speed information and tells of our Protection Tag. Free on application.



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RACING CAR No. 13660/1

No. 13660/1 is a large racing car copied from Gordon-Bennett Cup Racers. It has a large square hood with honeycomb radiator, reversible steering gear, hand lever operating brake on rear wheel, back of seats perforated and fitted with plush cushions; extra tire is strapped to rear deck, as shown in illustration. This car is the handsomest toy of the kind ever put on the market. The car is enameled dark green with brass trimmings. Size of car is: total length, 12 in.; height, 4½ in.; track, 4 in.; wheels are 2½ in. in diameter with ⅜ in. rubber tires.

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Notice also the perfection of the Premier transmission gear—minimum loss of power from engine to driving axles, and minimum friction on axles. These points, conjointly with abundant driving power and light weight (no heavy, needless water cooling apparatus) and with body mounted on springs of ideal riding qualities, produce that high degree of

Premier Efficiency

so much remarked by drivers of Premier cars. These points, supported by **practical demonstration,** should decide your next purchase. Pre-eminently **the winter car**—nothing to freeze.

FIVE MODELS

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Perfect in Construction & Handsome in Appearance & Correct in Style

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As the plum-pudding bespeaks the Yuletide feast, so let its spirit of good cheer and happiness be exemplified by

White Rock

—the finest of table beverages. A mineral water effervescing with healthfulness—refreshing in its purity.

DEPARTURES IN 1906 CONSTRUCTION

THE wide difference that separated European and American motor car manufacture a few years since is rapidly closing up. In Europe motor cars are becoming more and more a manufacturing proposition instead of a building one, while in America, the manufacturing side is not only considered, but improvements in part construction, assembly and testing are going on. The result is that foreign builders will, in the coming season, market a larger number of cars while the American builders will turn out far better cars than they have heretofore made.

One American organization, one of the pioneers in the field, has gone back to the European method of crankshaft making, and this against all previous canons of profitable manufacture. The American method of fashioning crankshafts has been to drop-forge them in two parts, electrically weld those parts and machine. It has always been believed that these shafts possessed the necessary strength, but European makers have held that this method has meant a weak shaft. It is a theory that when metal is heated to cherry red heat the strength departs, and that it could only be returned to the shaft by continued hammering. It is probably true that the pressure of business in drop-forge plants has meant a carelessness in hammering which has resulted in weak shafts.

The European method has been to drill squares out of a solid block of metal, followed by machining the shaft cold. In Europe, machine cost does not nearly begin to compare with labor cost in America, and this method has been universal, even though two to three weeks is required in the operation. It is significant that one American builder is to employ this expensive method of shaft manufacture in 1906 cars.

The use of high carbon steel, too, is new with 1906 cars made in America, contrasting favorably with European raw stock. In America the cost of machining such tough stock has precluded its use, but now that other costs have been reduced, manufacturers are seeing their way clear to introduce these features which cannot but make for greater value in cars, and while this does not bid fair to bring about a reduction in cost, it does mean better American cars.

In motor and gear case bearings, too, American makers have gone a long way this year. No American car of 1906 will give the bearing trouble that has been experienced in other years. Again the European and American builders are getting close together. German Babbitt metal will be the selection of several important American builders, the same as it is of the Mercedes and other foreign builders.

There is no gainsaying that England leads in body designs, and the continent builders as well as American makers have had their cars so close to Longacre district, London, that the similarity in body designs will be close in all cars, imported and domestic. England probably leads in this direction for the reason that purchasers of chassis, as made for the most part by English motorists who commission their regular coach builders to conceive bodies for them, aiding them in suggestion, and allowing a wide range of latitude. While there is an absence of individuality in makes for this reason, there is no doubt but what this latitude has done much to realize ideals in body design.

Upholstery in both America and Europe has always had a similarity, and probably for the reason that in America this work is done by workmen of foreign nativity, whose field allows of little opportunity to depart from beaten paths. In painting there is a tendency in both Europe and America towards more quiet color schemes and to avoid striping; but plain colors will be relieved and panel surfaces accentuated by a forceful marking of mouldings.

It seems easy to forecast better built and handsomer appearing cars for 1906. Surely America has made strides of great magnitude.

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Amesbury Mass.



Gas Headlight No. 12
Side View



Design Patent applied for



Gas Headlight No. 12
Three-quarter View

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Rich and Exclusive Designs not shown by any other manufacturer

Our Lamps appeal to critical people who want goods that are *strictly high grade.* In the ATWOOD MANUFACTURING CO. lamps you have an absolute guarantee of the *best,* backed by 30 years' successful Lamp making.

RAUCH & LANG ELECTRIC

THE SUCCESSFUL "LONG CHARGE" 1906 VEHICLE

STANHOPES
SURREYS
COUPES
DEPOT
WAGONS



1906 Stanhope, $1,800

This model is absolutely up to the Standard of all our Claims

Machines now operating in and about Cleveland are making 75 to 85 miles on one charge

Write for Catalogue A

The RAUCH & LANG CARRIAGE CO., CLEVELAND, O.
Opposite The Hollenden

ESTABLISHED 1853

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Time, 1:53:21 2-5

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The "Breech-Block" Plug

The Plug With a Handle

To take out your *watch* or open a *Breech-Block* requires just the *same time, same tools, same effort,* and *one turn!* cleans the *entire* porcelain to the whiteness of snow.

To remove the porcelain only, loosen the clamping nut and it *drops* out of its holder, and the gaskets of copper *drop* with it. No digging!

It is *nickeled* inside and out. *Highly polished* and *rust-proof.* Sparks between *two adjustable* points and not between *one* point and the *shell.* Its points are *protected.*

Porcelains are *hand turned* and so perfectly glazed that soot cannot *stick* to them. Their *threads* are cut to perfection, and every particle of the idea of cheapness is left out of them

Postpaid, Anywhere, $2.50. Booklet Free.

Made by EARL CANEDY,

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National

MOTOR CARS

In TWO NEW MODELS, improved and better than ever, will be ready shortly.

We have a surprise to offer which will make *everybody*

"Watch for the Round Radiator"

NATIONAL MOTOR VEHICLE CO.
1004 E. 22d Street, - Indianapolis, Ind.

MOTOR CALENDAR

DECEMBER

DEC. 8 to 24	Paris Show

JANUARY, 1906

JAN. 13-20	Automobile Club of America, sixth annual motor car show at Sixty-ninth Regiment Armory, New York
JAN. 13 to 20	Association of Licensed Automobile Manufacturers, motor car show at Madison Square Garden, New York

FEBRUARY, 1906

JAN. 22 to 27	Ormond-Daytona, Fla.; annual beach speed contests
FEB. 3 to 10	Chicago; National Motor Car Show at Coliseum
FEB. 12 to 17	Detroit; Tri-State Motor Car and Sportsman's Show
FEB 20 to MAR 8	National Motor Boat and Sportsman's Show, New York

MARCH, 1906

MAR. 16 to 23	Boston Show

N. A. OF A. M. AFFAIRS

At the November meeting of the executive committee of the National Association of Automobile Manufacturers, Inc., it was decided to limit the sanctions for local shows to those cities in which shows were held last year, and to give them only on the conditions that the proceeds of such shows must go to organizations of local dealers. Such local organizations must admit all reputable dealers who have been such for at least one year upon the same basis as all other members, and the dealers must not call upon the manufacturers they represent for financial assistance in the conduct of their exhibits.

An erroneous impression was given out by some of the daily papers concerning the association's resolution on road contests. The association does not expect to sanction such events. It will probably take into consideration the details of such contests as may be proposed, and make recommendations to its members. It will, of course, be glad to receive details of such contests as may be proposed.

The license test case was before the Court of Common Pleas in New Jersey in the November term. The court has not rendered a decision, but it has been arranged that an appeal will be taken, no matter what the decision may be.

CHICAGO SHOW SPACES

THERE will be a slight delay in the announcement of the allotment of space at the Chicago Show, due to the fact that the applications so largely exceed the available space. All of the space set aside for accessories in the gallery has been allotted by the Motor and Accessories Manufacturers.

For space in the motor car section, which occupies the main floor of the Coliseum and the first floor of the annex, there are eighty-seven applicants, who desire to show 368 cars, and who apply for 224 spaces, aggregating 62,845 feet. The number of spaces available is 135, aggregating 39,427 feet.

The management seriously considered the erection of a supplementary gallery eighteen feet above the floor, thirty feet wide and running around the building. This would have furnished about 18,000 feet additional space, but was abandoned on the advice of the building commissioners, in view of the danger of fire, in view of the enormous quantity of lumber required in its construction.

PROGRAM OF FLORIDA MEET

AFTER several conferences between the representatives of the F. E. C. A. A., the racing board of the A. A. A., the N. A. of A. M. and the A. C. C. A., submits following list of events, which provides for all weights and powers, and at the same time brings the different cars into the free-for-all competitions at distances of one, five, ten, fifteen, thirty and one hundred miles.

One-mile middleweight championship (gasoline).
One-mile heavyweight championship (gasoline).
One-mile championship (steam).
One-mile world's championship, free-for-all for Dewar Cup.
One kilometre record trials for each weight and power class.
One-mile record trials for each weight and power class.
Two-miles-a-minute record, free-for-all. (The winner must equal or exceed 120 miles an hour.)
Five-mile middleweight championship (gasoline).
Five-mile heavyweight championship (gasoline).
Five-mile championship (steam).
Five-mile free for all championship.
Ten-mile middleweight championship (all powers).
Ten-mile heavyweight championship (all powers).
Ten-mile free-for-all championship.
Ten-mile handicap. Open to contestants who start in previous events.
Fifteen-mile free-for-all championship.
Fifteen-mile Tyres Handicap for American touring cars, fully equipped.
Thirty-mile free-for-all championship for American-built cars.
One-hundred-mile free-for-all championship.
The prize list, as usual, will be exceptional in character, and will contain many trophies of great value.
The entrance fee for each event, except the Dewar Cup race, is $20. The Dewar cup entrance fee is $50.
Entries will close January 8, 1906.
Applications for entry blanks should be addressed to W. J. Morgan, 116 Nassau street, and from the same source any additional information may be obtained.

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ROYAL TOURIST

POINTS. Runs quietly—Costs less for repairs than any motor car built anywhere—Steers easily—Perfect control of motor—Certainly is fast—Is built with care.



ROYAL TOURIST

We have a full description of 1906 model ready to mail to you if you will send us your address. Will also mail booklet explaining performance of '06 model in Vanderbilt Trial Race.

THE ROYAL MOTOR CAR CO.

Cleveland, Ohio.

AGENTS: C. A. Duerr & Co., New York, N. Y.; G. J. Dunham, Boston, Mass.; The McDuffee Automobile Co., Chicago, Ill.; G. W. Caplin, Minneapolis, Minn.; Automobile Supply Co., Lim., Toronto; Motor Shop, Philadelphia, Pa.; Westminster Automobile Co., St. Louis, Mo.; Standard Automobile Co., Pittsburg, Pa.; Amos Pierce & Co., Syracuse, N. Y.; Thompson Schoeffel Co., Rochester, N. Y.

Member A. L. A. M.

DANGER AHEAD!

RELIABLE LIGHT

Cannot be had with a gas generator, but it can always be had with any good lamp and the

PREST-O-LITE Gas Tank

Steady, even run of pure, cool gas, enough to supply two searchlights fifty hours. Never out of order, never leaks, never freezes, never clogs tips. Always ready with a full supply the instant it is turned on.

CLEVELAND, O., July 27, 1905.

PREST-O-LITE GAS TANK COMPANY,
Indianapolis, Ind.

GENTLEMEN: I have used four of your Prest-o-Lite Gas Tanks since January 15th. They have proved entirely satisfactory and I don't believe I could get along without one now. You can always count on me being a steady customer. Yours very truly,

BARNEY OLDFIELD.

To be had of all dealers. Empty tank exchanged for full one by any dealer.

PREST-O-LITE COMPANY

Agents in all cities — INDIANAPOLIS

Price Complete $35

Exclusive licensees under patents of the Commercial Acetylene Company.

Tank Recharged by any dealer at small expense.



Elmore PATHFINDER

Find an Elmore agent or user and you'll find a two-cycle enthusiast. The fame of the two-cycle idea has spread this season from ocean to ocean. Its principle—a continuous application of power—is irresistible and indisputable; and that principle is put into practice with absolutely perfect success in

THE TWO-CYCLE ELMORE

Picture to yourself two men—one trying to crank the gasoline in long, hard jerks, the other flinging aside in quick, short steps. The test is the first step—bound to lose against the two-cycle with its even, steady gait. We have a book titled "A Long Jump or Two Short Steps," which explains this in A. B. C style.



Better still, we have a second of thousands in every load worthy of the name. Better still, we have its every day testimony of thousands of users to which you can easily refer.

The Elmore [illegible] is right in our hangers the "moving" engine. It is here. You can verify [illegible] claims. [illegible] records. Ask your agent or write to us.

THE ELMORE MANUFACTURING CO.
Amanda Street, Clyde, Ohio



50 H. P. AUSTIN 1906 Model

Exclusive AUSTIN features: New complete double ignition system, improved (patented) sliding gear transmission (selective type), four forward speeds with new (patented) method of operation, new (patented) spring controller absorbing recoil. A beautiful and exceptionally well built car, strong in every part. Write for full particulars.

Austin Automobile Co.

GRAND RAPIDS, MICH.

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CANDY CARBIDE
For FRENCH AUTO LAMPS (Impregnation dans la vide)
Packed only in 10 lb. cans. Price $2 each.
Discount to dealers in case lot of 12 cans.
SOLE MANUFACTURERS
ACETYLENE GAS ILLUMINATING CO.
106 WALKER STREET NEW YORK

ARDSLEY Body, Roi des Belges; H.P., 22-30. Weight, 2,300 lbs; Weight per H.P., 75 lbs; Wheels, 34 inches; Tires, 4 inches; Wheel Base, 110 inches; Seats, 5 people; Water, 8 gallons. Ignition, double set, including two sets of plugs over inlet, one operated by battery and spark coil, the other by high tension magneto with distributor and spark advance, thus giving two separate and distinct systems of ignition.
PRICE, $3,500. Write for Catalog
ARDSLEY MOTOR CAR CO., YONKERS,
NEW YORK CITY AGENCY - BALDWIN-REMMIE, INC., 811 W. 48th Street

ASTER MOTORS FOR AUTOMOBILES AND BOATS
1591 BROADWAY, NEW YORK CITY

Auto Protective League
Organized under the laws of the State of New York.
It is the main object of the corporation to relieve owners of automobiles of all cares, inconveniences and difficulties in any way relating to, or in connection with, the use of automobiles. Write for particulars.
Main Office, 43 WEST 38th STREET, NEW YORK CITY
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SLIP COVERS
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CAPE TOPS FROM $25 UP
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We repair or remake old Automobile Tires. Let us repair your Rims. Repairs done immediately on receipt, and satisfaction guaranteed. All Recovering Tires our Specialty.
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FOR BETTER LUBRICATION
DIXON'S GRAPHITE MOTOR LUBRICANTS
Interesting Booklet and Samples FREE
Joseph Dixon Crucible Co., Jersey City, N. J.

PREMIER

(Continued from page 77.)

No evidence of overheating has been observed in 200 miles use on the road, and standing in a closed shop severe tests were made by brightening two spots on the cylinder head immediately under the intake and exhaust valves, after which the motor was run for about fifteen minutes at a speed of 600 revolutions per minute, without a fan or other artificial radiation, and being subject to no cooling by reason of open doors and windows. The brightened spot under the inlet valve showed no change whatever in the color of the metal, while under the exhaust valve the spot located on the very hottest part of the cylinder showed a slight turning to the point of deep straw color. At no time had the motor been sufficiently hot to burn the oil off the cylinders, and a number of witnesses, among whom were highly capable judges of motor construction and operation, were thoroughly satisfied that under reasonable conditions the motor would not overheat.

The car has shown remarkable speed, and while no opportunity has been presented for the purpose of determining the actual possibilities, a speed of a mile in very much less than a minute has been attained on the smooth portions of country roads near Indianapolis. There seems, therefore, no possibility of a doubt existing in the minds of fair-minded judges, of the system of radiation here employed accomplishing the object for which this remarkable car was built. So far no motor of this type even approaching it in size or power has ever been constructed, and it seems to answer most successfully and irrefutably the question of prejudiced minds, "Will it cool?"

HORSE DRIVING "ROAD HOGS"

We have always been an advocate of the idea that one of the most important functions of local and national motoring associations should be to prosecute to the full extent of the law the "hogs" who do things to the prejudice of the equal rights of motorists. In the enforcement of these rights, foreign associations do this more effectually, heartily, and persistently than we here. It is the temperament of the American to put up with more infringement on his rights than any other nation, but an association should have no temperament; it should enforce its members' rights and relieve them of all the burden except giving testimony. It is surprising what a salutary lesson it is for a "road hog" to have to pay $60 for his fun, and then an extra $5 for using bad language, when he was remonstrated with.

The following four cases, all successfully fought, are in point. Everybody knows that by the rule of the road, traffic going in one direction keeps one side of the road, and in the opposite direction on the other side. Yet every one is equally aware that tradition justifies a driver going up a hill zig-zagging it, crossing from one side to the other; and if he does this with due regard to other people coming down, nobody ever complains. But if, when half-way up, a driver stops with his cart askew, across the middle of the road, and if a motor car passes *at the back* of his cart the horse's driver deliberately backs it into the motor, he has abused a time-honored privilege and become a "road hog," so the judge thought, for he made him pay $60 for repairing the damage he had done to the motor car. In another case a peddler driving a cart took no notice of horn or request, and dodged in front of the motor car time after time. A driver attempted to pass, keeping up his obstruction for three miles, although twenty-two crossroads had been passed, into which he might have drawn. He was fined as a "road hog." The third case was one where six horses chained together circled round the car, to the great joy of two agricultural laborers. These "road hogs" felt the arm of the law. The fourth was of a "road hog" who wilfully pulled his pony across the road to obstruct a motorist. This was the "hog" who, when remonstrated with, swore, for which offense he paid an extra $5. There are occasions every hour of the day for proceeding against similar sturdy rascals here.


Auto Goggles
Latest styles
Manufactured by
JNO. SCRIDIG & CO.
43 Maiden Lane
NEW YORK CITY
Send for illustrated catalogue and dealers' discount.
All Kinds of Goggles Repaired

NOT A MIXTURE—A POLISH
"GLOBE" METAL POLISH
Does Not Rub Off or Dirt Keep the Metal.
Imparts a Lasting, Brilliant Luster to any Metal.
No Waste. No Caking. No Tarnishing.
SOLD EVERYWHERE

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"The Automobile with a Reputation Behind It."
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STUDEBAKER AUTOMOBILE CO., SOUTH BEND, IND.


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High Grade
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Portable Garages for the smallest runabout to the largest touring car.
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A HIGH GRADE SCHOOL OF INSTRUCTION FOR CHAUFFEURS AND AUTOMOBILE OWNERS
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MOTOR LAMPS
STAND THE TEST
Investigate!! Don't Experiment!!
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Cleveland

THE complete Chassis of the *Cleveland* car is manufactured by the Garford Company, whose experts have designed and built more high grade automobile parts and complete Chassis than any other concern in America, and the *Cleveland* is therefore the product of years of practical experience.

No other American car is made of such uniformly perfect and high grade material adapted to the purpose, or so thoroughly and intelligently assembled. There is no car on the American market that will stand up to its work so well or so long.

Infinite care is exercised in every detail of construction and the *Cleveland* car represents the highest and most advanced ideas in automobile building.

It is in a class by itself.

Price $3500.00

The new 1906 30-35 *Cleveland* is considered by experts to be the most perfect American car ever manufactured

The cylinders are cast in pairs, and have extra large water jackets, insuring positive cooling.

The *Cleveland* ignition is by Simms-Bosch low tension magneto with automatic make and break spark. This mechanical movement is distinct and original and is wonderfully efficient. It does away with all jump spark troubles, batteries, coils, spark plugs and all complicated and undependable wiring. The *Cleveland* car is the first American car to use the Simms-Bosch low tension magneto ignition system which has been adopted and used by every high grade foreign car for the season of 1906.

The transmission is peculiarly accessible and mechanically perfect. The shafts and bearings are ground accurately to size. The gears—the heart of the transmission—are high carbon steel oil hardened with absolute accuracy, made by the most approved machinery, insuring smooth running and long service. Three speeds forward and reverse with direct drive, 6 to 45 miles per hour on third speed.

The *Cleveland* Carburetor is built after the most approved type and has a compensating air opening, permitting perfect mixture at all speeds automatically, thus making the *Cleveland* engine most flexible in its control.

The 1906 *Cleveland* weighs 2200 lbs. — acknowledged to be the strongest and lightest construction for perfect running results with a 30 H.P. engine. 32x4 tires are used assuring great tire economy.

Bodies are furnished in either the Victoria or Tulip model—their lines being unusually trim and smart. Every *Cleveland* is just as good to look at as is its mechanical construction. The yearly guarantee which goes with every *Cleveland* car shows our faith in its quality.

Catalogue and full information on request.

CLEVELAND MOTOR CAR CO.
DEPT. 1, CLEVELAND, OHIO

Mr. E. B. Gallaher, 228-30 West 58th Street, New York
General Eastern Distributing Agent



DETROIT to NEW YORK

IN 48 HOURS WITHOUT AN ADJUSTMENT

of any kind except replacing two springs broken through accident

This 22 H. P., Model F, $1,850 Pungs-Finch car was driven from Detroit to New York in October, in 48 hours running time, without a single adjustment or repair except to springs broken through accident.

State of Michigan } S.S.
County of Wayne }

Edward B. Finch and Harry F. George, both of Detroit, in said county, being severally, duly sworn, each for himself, says that they drove a 22 H. P., Model F., Pungs-Finch Peerless stock Touring Car, from Detroit to New York, Odometer register of 646 miles, in 48 hrs., running time, making absolutely no repairs or adjustments on the way, excepting for broken two springs, broken through accident, and tire repairs.

Subscribed and sworn to before me this 7th day of November, A.D. 1905.

Edward B. Finch
Harry F. George

Dwight C. Redford,
Notary Public,
Wayne Co., Mich.
My commission expires June 6, 1907

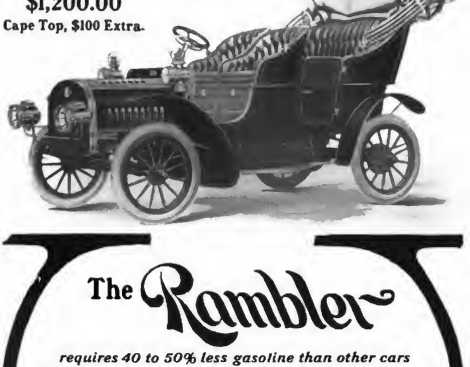
Don't fail to see our line before buying your 1906 car. It's right.

Pungs-Finch Auto Co.

Detroit, Michigan

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Surrey, Type One,
$1,200.00
Cape Top, $100 Extra.



The Rambler

requires 40 to 50% less gasoline than other cars

110 miles, over three mountain grades, from Los Angeles to Santa Barbara, Calif., on **7 1-2 gallons of gasoline**, is the Rambler record. The three other cars with perfect scores used 9¼, 10½ and 12 gallons respectively.

A practical demonstration at any Rambler agency of Rambler ease of control, simplicity and reliability of mechanism, slight cost of fuel and maintenance, will prove to you that the Rambler is the car for you to buy.

Surrey, Type One, illustrated above, complete with lamps, horn, tools, etc., $1,200.00. Cape top $100.00 extra. Write for catalogue illustrating and describing six different models from $650.00 to $3,000.00.

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"PIPE" MOTOR CARS

20 H. P. 28 H. P. 40 H. P. 80 H. P.
In All Styles of Bodies

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TRUFFAULT-HARTFORD SUSPENSION

Whether you own the lightest Runabout or the heaviest Touring Car, you cannot afford to be without it. Cars under 1,500 pounds, $60; cars over 1,500 pounds, $80. A suspension.

HARTFORD SUSPENSION CO.
69 Vestry Street, New York City



STA-RITE
SPARK PLUGS

DEALERS

do not buy spark plugs of half a dozen concerns, it isn't necessary.

Condense Your Orders

Shut obtaining lower prices, and use "Sta-Rites" exclusively. There are now 28 different sizes and styles, Porcelain and Mica, 75c. to $4.00.

Secure July, 1905, price list.

Geo. R. E. HARDY CO.
225 W. Broadway, New York City



No. 4, ¼ in. Porcelain, $1.50 — No. 66, ¼ in. Mica, $0.75

SEE THAT YOUR DRIVING COAT OR RIDING CLOTHES are made of

"Cravenette" CLOTHS

"Rain will neither wet nor spot them."

Look for "Cravenette"

(trade-mark) stamped on back of cloth.

B. PRIESTLEY & CO.
Manufacturers of Woolens, Cravenette Cloths, Black Dress Goods, Mohairs, etc.
71-73 GRAND STREET, NEW YORK
Write for interesting booklet—free

FROM PROVIDENCE TO PROVINCETOWN

(Continued from page 52.)

some vicious motor driver should escape him, had evidently reduced him to a state of painfully pathetic leanness, and told we must reduce our speed. As we were really traveling as slowly as possible, the only way to have possibly reduced our speed would be to stop the motor and push the car. We continued on our way feeling rather guilty as though we had suddenly awakened a community of the dead. It seems almost incredible that such ridiculous speed laws should be made, for there is nothing of greater benefit to country stores, or country inns, than the tourists who travel by motor car. There are probably few, if any, motorists who object to a reasonable speed limit.

Through this section of the country the roads are of a sand-papered perfection. We passed through some very pretty villages—typical of New England—Centerville, Osterville, and Barnstable, all of which have speed laws of a snail-like order. We reached Hyannis at dark and decided to make this place our night stop-over. We went to the Iyanough House, where we found very comfortable apartments and good meals. We improved our opportunities and inspected Hyannis, which is really a very fine village, with many pretty homes, delightfully shaded streets, and a fine large Normal School. The country is noted for its exceptionally fine cranberries, and hundreds of pickers are employed during the season.

After breakfast on the following morning, we paid a visit to "Ye Eccleston Shop," a quaint old building not far from the hotel. About ten o'clock, we were ready to continue our journey. We were told here that we would probably be unable to get through to Provincetown on account of very bad sand—so bad that a motor car would be unable to pull through the entire distance; but having faith unlimited in the stick-to-it-ive-ness of our car we were not at all daunted. We followed the road through West Yarmouth and Brewster to Orleans, finding exceptionally fine roads and the most exquisite scenery. At Brewster is the estate and home—"Fieldstone Hall"—of Mr. Rowland C. Nickerson, of Boston, Mass., a magnificent building almost on the water's edge, and one of the finest places on Cape Cod.

Upon reaching Orleans, we were told by several of the inhabitants we could not get through the roads we would find below; that the motorists who had attempted it had usually turned back upon reaching Wellfleet, as they had found the roads impassable on account of sand. One of the natives, even more pessimistic than the rest, said we would get plenty of Cape Cod before our return, and if we ventured into the sand might be glad to be pulled out. Just after leaving Orleans we found their statements verified as regards sand. The trouble they predicted, however, did not overtake us, as our car carried us along finely with only a slight diminution of speed necessary to steer the car successfully through such soft roads.

At Eastham, we came to a fork in the roads, and upon inquiry were told to keep straight ahead, which we did and found, without exception, the worst road we have ever encountered. Besides being very sandy and very rough, it was evidently very seldom traveled. It kept growing worse until finally it became like a mere path through a literally deserted country. Stumps of trees and small bushes grew in the middle of this "road," and besides the deep ruts, which were so close together that it was impossible to avoid them, there were many loose rocks and stones.

We had about decided that we were not on the right road and were thinking of returning to Eastham and taking the other road when we saw ahead a small house and decided to make inquiries there. Upon reaching it we found the entire family assembled by the roadside, surprise and consternation depicted upon their countenances, and before we could make our inquiries we were told that we were the first motorists who had ever been there, as no mo-

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"National Batteries" FOR ELECTRIC VEHICLES

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RELIABLE

National Battery Company

ELECTRIC STORAGE BATTERIES

BUFFALO, N. Y.

"National Sparkers" FOR GAS MOTORS

BRANCH OFFICES: NEW YORK CHICAGO

SPIRAL TUBING RADIATORS



Owing to the great demand for our Spiral Tubing and Radiators made of same, we find it necessary to increase our factory facilities. On Jan. 1st, we moved into our new factory, which gave us more than three times the floor space for manufacturing purposes. We now find that we are obliged to enlarge our factory again. Therefore we have decided to open a new factory in Rome, New York, to take care of the Eastern and Export trade, which will be in operation Nov. 1st. Our new factory will be equipped with the most modern machinery and electric power for making Spiral Tubing Radiators and Hoods. It will be known as the Long-Turney Mfg. Co., of Rome, New York, and will be managed by Geo. W. Turney, who has been connected with the Rome Brass and Copper Co. and Rome Mfg. Co. for the past 14 years. The Long-Turney Mfg. Co. is licensed to enjoy all the privileges of the Long Mfg. Co.'s patents and patents pending on Spiral Tubing and Radiators.



LONG-TURNEY MFG. CO., Rome, New York, U.S.A.

Self-starting from the Seat
With Make-and-Break Ignition

"Matheson"

"America's Finest Motor Car"
1906 Models—40 and 60 H. P.

Our New Factory now building, in WILKES-BARRE, PA., will be one of the largest and most modern automobile plants in existence. We will move into this new plant about January 1, 1906. Address until then . . . . . **Matheson Motor Car Co., Holyoke, Mass.**

The Biddle & Smart Company
Amesbury, Massachusetts

Limousine
Landaulettes

Side Entrance
and
Runabout Bodies



Delivery Wagons
and Trucks

Also
Artillery
Wheels

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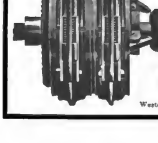
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tor car had ever traveled that road before. They directed us to go across to another road, which, though very poor, was splendid in comparison.

Shortly after this we came upon a refreshing stretch of macadam which lasted until we reached Wellfleet. Near here is the Marconi Wireless Experimental Station, and a little further on is Wellfleet, a delightful village with a beautiful harbor. From here on we encountered some of the best and some of the worst roads we have ever been over. Between Wellfleet and Truro, the road leads over many hills and really looks to be almost impassable, due to the sandy condition. Massachusetts has been expending a half million dollars each year upon the construction of roads and have some of the finest in the country, and no doubt within a few years the commission in charge will have a macadamized highway the whole length of Cape Cod.

Nearly all the horses in this region were very much frightened at our machines, and we made many halts to allow them to pass us. Occasionally the drivers were much more frightened than the animals—it being the first motor car that some of them had ever seen. The scenery through this part of the Cape is indescribably beautiful; wooded hills rich in many shades of green, little shaded ponds at your feet, a long stretch of luxuriant valley with the blue ocean just beyond and plainly visible. The highway came nearer and nearer to the ocean, until we were directly upon the shore. The roads were nearly perfection, and a fast spin brought us into Provincetown, the end of Cape Cod.

Cape Cod is a dear, quaint little town, with its one long and very narrow street lined on each side with shops and hotels, built closely together, and the beautiful harbor just at the centre of the town where in 1620 the Puritans in the "Mayflower" entered Cape Cod Bay and where the compact or constitution of government was signed by the Pilgrims. A memorial tablet erected in front of the old town hall bears an inscription to this effect, and on the reverse side is the text of the compact, with the names of the signers. We made our headquarters at the New Central House, which is a most hospitable place with very excellent accomodations.

The beautiful yacht belonging to H. H. Rogers, the Standard Oil magnate, was in the harbor. We drove over to Highland Light, a short distance from Provincetown and near North Truro, and were shown through the lighthouse, one of the highest on the coast, which we found very interesting, although it was a rather difficult and dizzy climb to the top where the beautiful revolving light is, the lens of which, by the way, weighs three tons.

We had a delightful return journey, free entirely from mishaps of any kind, and, after reaching Wareham, we took the road to the left leading up a short steep hill, and came home by a different route which afforded beautiful scenery, and brought us through several charming villages lying directly on the shore—Marion, Mattapoisett and Fairhaven. Then we drove over the finely-constructed Fairhaven Bridge, which is one mile long, into New Bedford. The roads from Wareham to New Bedford are of the very finest macadam and as smooth as a floor. From New Bedford to Fall River, a distance of thirteen miles, we found the road under construction and of rather difficult going. Fall River certainly deserves mention as having the roughest streets we have ever found in a city. All through the main part the pavements are cobble-stone of an exceedingly rough kind. From Fall River to Providence, the roads for the greater part are fair, and go by way of Warren and Barrington.

The next Ormond-Daytona race meet bids fair to eclipse even the brilliant one of last January, not only in achievement, but also in number of entrants and (though last, not least) as a social event. One of the foremost American motor-car manufacturers, which has not been represented by a racing car for more than a year, is building two racers for this event.

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DUST AND MOTOR CARS

MUCH of the opposition in England to motor cars is due to the amount of dust they create, and that in consequence there is considerable difficulty in renting houses located on roads used by motor cars.

A private demonstration was recently given with a Spyker car, which had been especially designed with reference to the dust nuisance, and for comparison the Spyker and several other cars, both English and foreign, were driven down selected portions of a road, while photographs were taken to show how much dust each raised. The *Autocar* reports the road was of a sandy nature and its dust-producing qualities so great that when one of the cars was driven over it at a speed of forty miles per hour the cloud of dust was so great that it was five minutes before the atmosphere was clear enough for the trial of the next car so that the photo could be taken.

A photo of the Spyker car when driven at twenty miles an hour over so dusty a road as that referred to indicates, according to the *Autocar's* photographic reproduction and report, that it "was as near dustless as possible," due "to the fact that the body is somewhat higher off the ground than usual, and that the protective metal apron gives a clear, smooth, clean run for the air passing beneath the car, and that the flywheel being inclosed no vortex is set up thereby to disturb the dust lying upon the road. The exhaust also is discharged at a good elevation and through a fan-shaped orifice directly toward the rear of the car, where it is claimed it tends to destroy the vacuum caused immediately in the rear of the vehicle by its rapid passage through the air, and to which is due the rising of the dust from the road." The *Autocar* believes that this quality of dustlessness, having been proved a salient feature of the Spyker car, "it will be appreciated by those considerate people who feel more than perturbed when driving through the country and leaving a pillar of dust behind them, even when their pace is kept down below the legal speed limit," especially as it indorses their views expressed from time to time "with regard to the effect of attention to the clear run given to the atmosphere beneath a car." Another motor car paper believes that the Spyker car, having shown the way, and that there are advantages in even the small changes in design which are on that car, there will be much study given to the subject and great progress made soon toward the elimination of the dust nuisance.

Many experiments are being made in Great Britain with a composition designed to render roads dustless. One of the most successful seems to be a composition called "tarmac," a proprietary article. Tarmac is composed of crushed slag, which is thoroughly mixed with a tar preparation while hot and used for surfacing roads.

Last year the condition of the roads after a period of dry weather, much longer in duration than often occurs in this country, has convinced Americans, much as they had always admired the smooth surface of English roads, that the method of making them would not be suitable for us, owing to our climatic conditions. They were softer than they could have believed possible and very dusty. They did not venture to express an opinion experts had that the motor car is proving that the method employed for maintaining English roads, while it has been suitable for ordinary climatic conditions in England, does not produce results adequate to present English traffic conditions.

Macadam taught the road surveyors of England how to make good roads, and it seems the introduction of an attachment to a steam-driven road roller, which renders it easy to tear up the surface of roads, and the fact that the roads thus torn up can be easily ironed out again by the road roller, has led the English road surveyors away from a fundamental principle of macadamizing, that any binding material must be carefully selected from materials which have a really binding character.

The attachment to road rollers for tearing

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THESE have been designed especially to meet the very wide-spread demand for articles of this nature which shall be as dignified and as decoratively effective, but yet not so costly as though fashioned of solid silver. They are made closely to simulate the Old English "Blackjacks" and "Leathern Bottels," those characteristic drinking utensils of the sixteenth and seventeenth centuries, which are to-day so eagerly sought after by collectors of artistic rarities.

THESE strikingly original examples of an artistic revival are to be found in all sizes from the drinking mug to the imposing Loving Cup, the tall Tankard or the well-proportioned Flagon. The bodies are of heavy hand-worked leather, the linings of red copper, the mountings, including the shields for monograms, inscriptions or armorial bearings, of sterling silver.

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Get a record of the two events

and compare!!

Put the

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elimination record beside the records in the real race

and compare!!

Study what the HAYNES did, and what some of the others didn't do

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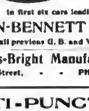
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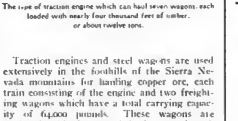
up roads consists simply of arms hung from the rear of the engine, these arms having affixed to each of them at the outer end a harrow-like tooth or pick. The arms or levers being weighted, as the road roller, now used as a traction engine, moves forward the steel teeth tear up the surface of the road to a depth of several inches. A few men can follow the work of the engine and smooth the broken surface of a road, filling in ruts and cavities, and then on the top of this there is thrown whatever binding material a surveyor finds most convenient, and this having been thoroughly soaked with water the surface of the road is then ironed out again by the steam road roller.

The surveyors have, it would seem, grown less exacting since the road scarifier attachment has been used as to the quality of the material for binding

STEAM TRACTION ENGINES IN THE FAR WEST

In the far west many enterprises have lagged and opportunities have laid dormant simply for the want of a cheap and efficient system of transportation There are many mining properties situated from five to fifty miles, and in many instances even a greater distance, from a railroad or steamboat landing, and the cost of hauling the ore or other materials by animal power becomes prohibitory, and many of these properties are not worked solely for this reason.

The traction engine is a practical solution of the problem, and, with wagons adapted to the kind of freight to be handled, it affords capacity, is economical in its operation, and can perform the work just as successfully as where horses or mules are used. The freighting outfits are adapted to haul materials of any and every description, but it is, of course, necessary to design wagons to meet the requirements of each individual case, and when this is properly done the cost of transportation may be reduced at least one-half and very often it will amount to a saving of two-thirds.



The type of traction engine which can haul seven wagons, each loaded with nearly four thousand feet of lumber, or about twelve tons.

Traction engines and steel wagons are used extensively in the foothills of the Sierra Nevada mountains for hauling copper ore, each train consisting of the engine and two freighting wagons which have a total carrying capacity of 64,000 pounds. These wagons are equipped with four steel buckets, and each bucket has a capacity of four tons of copper ore, which, when filled, weighs about 4½ tons, or a total weight on each wagon of 18 tons, a total for each train of 36 tons, exclusive of the weight of the train itself, which is 27½ tons more, making the combined weight 63½ tons. In the logging camps of California, Oregon, and Washington these heavy traction engines have likewise demonstrated their superiority as a motive power. They easily haul 250,000 feet of logs, equal to 75 tons, over level roads and 15,000 feet over mountain roads with heavy grades, one of the illustrations showing a logging train descending a 30 per cent. grade.

The engines used for these purposes are not of the ordinary traction variety built for running threshing machines and other agricultural work—these rarely exceeding 25 motorpower—but it is an engine made on entirely different lines and has an indicated output of 125 motorpower and actually develops 110 motorpower.

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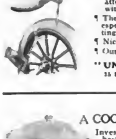
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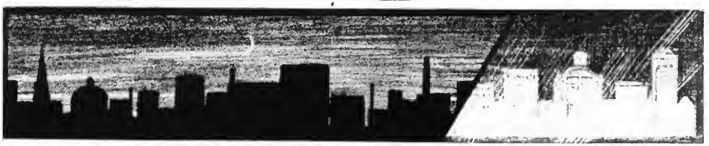
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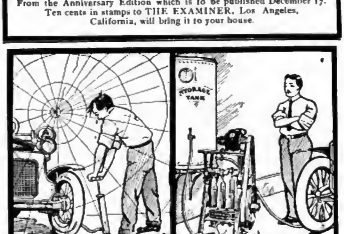
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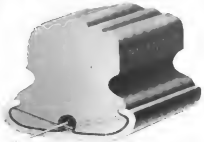
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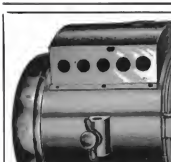


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Do's and Don'ts FOR MOTORISTS EXPERIENCE BOOK

Scraping Carbon from the Combustion Chamber.—A short time ago I scraped an accumulated deposit of carbon from the piston heads and combustion chambers of my car, and the process and attendant circumstances seemed to be sufficiently interesting to deserve recounting at some length.

My motor is of the two-cylinder vertical type, with the cylinder 4½ inches bore by 5½ inches stroke, and the compression is quite high. The inlet valves are automatic, and the spark plugs occupy their usual location in the side of the valve chamber, where they are somewhat sheltered from the oil from the piston and from the risk of overheating. When I first got the car last spring, after it had been used two seasons, I observed that it would continue running by spontaneous ignition for several revolutions after the switch was opened. It showed some tendency to pre-ignition when running, also, and it ran very hot—so hot, in fact, that the water in the radiator boiled energetically even if a short stop was made with the motor running. The overheating was cured by cleaning the radiator, in which the former owner had apparently attempted to use oil for cooling, with the result that all the air tubes were coated with oil, which acted as a very good heat insulator. When the overheating had been brought under control, which was done by cleaning the radiator with a mixture of kerosene and oil soap, the tendency to pre-ignition was also reduced, and it did not for some time become troublesome. One characteristic feature, however, remained. This was the tendency in both cylinders for the combustion to take place extremely rapidly, giving the explosions an unnatural hardness and making it advisable to regulate the spark advance with some caution.

After a time I discovered that the wire gauze over the end of the intake pipe had become partially clogged with oil and dust, and I gave it a thorough cleaning. The result of this was to reduce the suction in the mixing chamber of the carburetor, and I soon discovered that this necessitated a readjustment of the mixture-controlling lever on the steering column. Previously, I had found that the only position for the mixture lever to give good results was in the extreme forward position, in which the stream of carbureted mixture in the carburetor was diluted to its maximum extent. Since cleaning the wire gauze over the intake, however, I found it expedient to draw the mixture lever back slightly, especially at slow-motor speeds. Unless I did this active pre-ignition would occur when the motor was drawing a full charge, as when going up a hill. I found that retracting this lever back slightly not only stopped the pre-ignition, but made the motor pull more strongly than it had ever done before, for the reason that the charge burned slowly instead of with excessive rapidity, and, consequently, held its pressure instead of giving up its heat immediately to the water-jacket before expansion could take place.

For some time the engine worked very well, but I was getting only ten miles out of a gallon of gasoline, whereas I was confident that I ought to get fifteen or twenty, so I planned to get a new carburetor.

Meanwhile, however, the trouble with the pre-ignition was becoming more acute, and it finally became so aggravated that I was almost afraid to change from intermediate to high gear, as it was hardly possible with the most dexterous management to do this without the ominous *bang, bang*, which betokened early spontaneous ignition. I made one attempt to take the cylinders off, and found the task so formidable that I gave it up and looked about for other means of relief. This I found in the shape of a bent-iron scraper, which could be introduced through the inlet-valve hole, but found that this was impracticable on account of the peculiar shape of the casting surrounding the inlet valve So I took two pieces of five-sixteenth-inch iron rod, each about ten inches long, and had flat chisel points forged on the ends, these ends being turned up for about one-quarter inch at right angles. The rods were sharpened to cut the carbon, and were bent to the right or left, as was required for reaching the sides of the combustion chamber from the spark plug hole.

Armed with these tools, I squirted kerosene liberally through the compression cocks and devoted the larger part of a tedious afternoon to the scraping process. I found the deposit of carbon quite abundant, and the best part of it came out on the tool, to which it adhered owing to its being moistened with the kerosene. It was evident, however, that a considerable part of the carbon, although detached from the piston-head and combustion-chamber walls, was not coming out with the scrapers, and there seemed to be no way of expelling this except to allow it to be carried out through the exhaust valves when the engine was run.

The next day I put a fresh supply of oil in the crank case, to insure that the piston should be properly lubricated, in view of the fact that the kerosene used for loosening the carbon deposit the day before had undoubtedly cut away the oil around the piston. I started out with the motor smoking, but did not take the fact to heart, as I should have done. I was reminded of my neglect after I had gone about five miles, when the motor suddenly began missing explosions, and presently stopped altogether. I took out the spark plugs and found the inner ends almost choked with a deposit of mingled oil and soot. I cleaned them with considerable delay and difficulty, and opened the drainage plug at the bottom of the crank case. The offending oil came out looking very black and dirty, owing, doubtless, to a portion of the carbon having worked past the pistons to the crank case. When I restarted the motor I found that something was obstructing the gasoline flow to the car-

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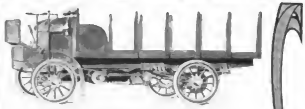
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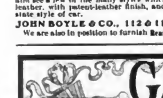
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burreter, as I had to pull the mixture lever back to a point previously unheard of. As it was getting late, I postponed further investigations and returned home.

Before I took the car out again I gave several weak points in the motor a thorough overhauling. One of the exhaust valves was leaking slightly, owing to the stem coming down against the push rod when the valve was supposed to be closed. I filed about one-thirty-second inch off from the valve stem and ground the valve to its seat. The other valve I found needed grinding also, partly because the seat was pitted and partly because some bits of carbon had lodged under the seat the last time the car was run. The inlet valves, which were of the single-piece variety, had bronze spiders, and the valve-stem guides, which formed a part of these spiders, had broken off short. I sent the valves back to the maker and received new ones with steel spiders, free of charge. I used the scrapers again in the combustion chamber, expecting from the appearance of the spark plug that a considerable extra deposit of carbon would be found. To my relief I found hardly enough to be worth scraping out.

When I put things together again, with everything tight, I found the compression still weak, and ascribed this correctly to leakage past the piston rings, which were probably still clogged by the carbon, which had worked down through them from above. As it turned out, the rings worked themselves free after the car had run a few miles, and the compression was before long as good as could be asked. The obstruction in the gasoline supply was found to consist of a wad of something resembling cotton fluff, which had gradually accumulated in the gasoline pipe at its connection to the carbureter. It was easily found and removed.

With all these changes made, it was seen almost at once that there was a remarkable improvement in the action of the engine. The explosions were soft instead of hard, showing that formerly, even when actual pre-ignition did not occur, the first increase of pressure in the charge, after the spark, had caused the heated carbon to ignite it at other points, so that the charge was burning from two or more points at the same time. It was no longer necessary, in order to prevent the charge from burning too fast or from pre-igniting to move the mixture lever back from its foremost position. Even at comparatively slow-motor speeds the car would climb hills in the intermediate and third gear, which previously it would not take except in the next lower gear. This, of course, indicated that the motor was getting a greater mixture with the mixture lever clear forward, and the motor running somewhat slowly, and the added power was explained by the fact that the mixture was correct, instead of incorrect, as it had been before when made over rich for the purpose of preventing it from burning too fast. I could now start from a standstill and get into the high gear inside of fifty feet, since there is no pre-ignition at even the slowest motor speed, and the motor will do its work and accelerate the car even when the latter is moving as slowly as five or six miles an hour.

It is evident from the above that when the motor runs at ordinary or high speeds it is getting too rich a mixture, but even with the present carbureter, by restricting my speed to about twenty miles an hour, I can get from fifteen to eighteen miles out of a gallon, and I can take continuous grades of five per cent., and short grades of seven or eight per cent., on the high gear. I can always hold my hand on the radiator and lately I climbed a sandy hill, about one-quarter of a mile long, on the low gear, and did not find the radiator uncomfortably hot even after that climb.

As I write this the symptoms of pre-ignition are beginning to return in one cylinder, indicating that, as I have already stated, I am still using too much gasoline. I am going to change the carburetter in a few days, putting in one of the latest American automatic carburetters, and when I have tried it I may have something more of interest to report.

Oil for Cold Weather.—The subject of cylinder oil for cold weather is a live one at present. There are three ways in which the difficulty caused by the oil thickening in the lubricator and refusing to flow may be avoided. It is not sufficient simply to provide a mechanical oiler, since, although this will undoubtedly force whatever oil gets to the pumps, the latter will not suck oil so thick as to refuse to flow to the pump under atmospheric pressure. In other words, the pump will simply produce a vacuum during a part of the stroke, instead of drawing the oil.

One thing to do is to use a lighter oil of the same general character as the heavy oil, and increase the feed. The lighter oil will not have the same body when it gets into the cylinder as the heavy oil has, and it will burn away more rapidly, so that for both these reasons an increase in feed will be necessary. On the other hand, this oil is cheaper, and the total expense of lubrication may not be increased. With this solution of the difficulty the danger to be avoided is of getting an oil which carbonizes in the cylinder. The fact that the oil of medium density has a lower fire test than the heavy oil does not necessarily prove that it liberates more free carbon, but it is likely to do so.

The second way to avoid the difficulty is to use the same heavy oil as in summer, but to reduce it with kerosene, increasing the feed as before. The trouble with this is that kerosene itself leaves a certain amount of carbon deposit in the cylinder, but, nevertheless, this arrangement is often recommended and appears to be reasonably successful. Some users recommend using gasoline to thin the oil instead of kerosene. If the weather is cold the gasoline does not evaporate any to speak of, and it has the obvious advantage of leaving no carbon deposit. The third solution is to use a special cold test oil, which does not thicken in cold weather. Oil of this sort, which is made especially for this purpose, costs twenty-five to fifty per cent. more than ordinary cylinder oil.

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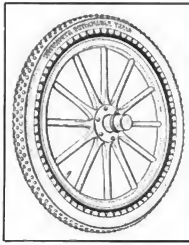


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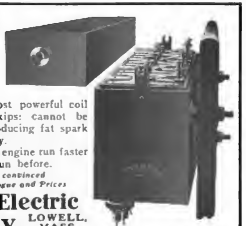
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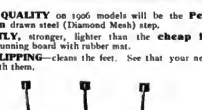
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SANTA CLAUS ON MOTORING

By Helen Smith Dayton

"Good gracious, Mary Louise!" ejaculated Santa Claus to Mrs. Claus, glancing over his vast consignment of mail, "if every kid in my Blue Book doesn't want a motor car in his stocking!"

"I notice the same tendency in my correspondence from their mothers and fathers," said Mrs. Claus. "The men want me to use my influence over their wives to have them select motor togs and fixings in place of slippers, cigars and smoking jackets."

"Well, I can see where I've got to cancel that last order for locomotives, fire engines, hobby horses, sleds and express wagons, and place, instead, a rush order for toy motors," sighed Santa, tearing open another envelope. "There's a penny inclosed in this letter from a three-year-old asking to please send her a great big truly motor car for her dolly. Hum! even the doll's carriage is considered Victorian by the up-to-date infant."

"I suppose the motor appeals to the childish imagination," commented Mrs. Claus, "the great car that sweeps down the thoroughfare like a goblin out of one of their fairy books."

"It's the mechanism that appeals to the small boy," said Claus. "The curiosity that was once directed toward the drum and its interior has been transferred to the busy wagon and its workings. The picturesque motor claims the admiration once given the steam engine. And it truly is astonishing how much information the small boy has accumulated as the result of his study and observation. Most any urchin could pass a creditable examination in motorology. Time was when you could satisfy a kid with a toy that just looked gaudy and made a noise, but that day has passed. If the present tendency keeps up babies will cry for rubber tires to cut their teeth on, scorning the old-fashioned devices. Just listen to a group of youngsters around a big car, and there won't be a detail they can't talk of intelligently, nor can you fool them on the make of a car. It's a good, healthy interest and I shall encourage it."

"Will you give them cars with real motorpower?" demanded Mary Louise Claus.

"No; except in a few cases where papas slip me good-sized checks to fill special orders. In these instances the cars will be completely equipped, only, of course, with pony power," explained Mr. Claus. "Some of the older boys have built quite presentable bodies, and I am to furnish motors and a few fixings. The majority, though, will be propelled by calf power."

"Calf power?" interrupted Mary Louise.

"Leg power—same thing," said Claus. "And, of course, every order I get has a postscript not to forget goggles and other paraphernalia. As George Ade says, 'get a good make-up and the part will play itself.'" Santa Claus chuckled, for the demands of his clientele always amused him.

"Children are getting altogether too precocious," commented Mrs. Claus.

"So an automobile dealer found to his cost recently," smiled her husband, grimly. "You see he was trying to sell a wealthy old gentleman a motor car for his son's family. The salesman spent much time in educating the aged man and his son on the merits of his car until they didn't know there was but that one car made. He had them winging all right—all the family, in fact, except a boy of eight years, who said he preferred the Whizandgo make. The salesman laughed and patted the little shaver on the head and said he guessed little boys ought to be glad to ride in whatever automobile their fathers and grandfathers picked out. The next day he went to get the old man's promised autograph on the contract with happy confidence.

"'I'm sorry,' said the Prospect when the salesman approached to clinch matters, 'but we've just closed with the Whizandgo people. My little grandson prefers that make.' That child is a shark on motor cars, sir—knows more about 'em than—.' But the agent says he didn't linger around to listen to the cherub's praises, but rushed to the nearest kindergarten to line up any scholars contemplating the purchase of high-power motors. He was going to reach the Boy Behind the Automobile the next time. It's indeed a wise salesman who plays to the nursery!"

And Santa Claus smiled as he filled his pockets with lump sugar to take to his reindeer, pensioned off in a nice pasture, since he bought his big new touring car and swell electric delivery truck.

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A FOREIGN motor car, the Diamant, shows some new mechanical ideas in its rear axle construction. It is on the principle of a cardan drive, but, instead of having an ordinary straight axle, the driving shaft is supported by a bridge-like construction which sustains the weight about the springs and relieves the driving shaft entirely from this strain. The entire differential box is supported at its outside edges by the tubular construction shown in the illustration.



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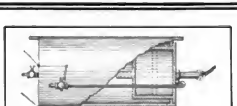
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A minor accident on the third day and the delay by the express company caused the temporary withdrawal of the car. Every minor part will hereafter be obtainable at any agency.

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They prove that for four days of the run the Frayer-Miller carried five passengers 420 miles for $2.10 2-5 per passenger. Whereas the Compound No. 6 secured a record of $2.11 2-5; Reo 'bus, $2.13; Reo runabout, $2.29; Olds, $2.49; and others in larger amounts.

The Frayer-Miller ran 3,202 miles, the distance from Golden Gate to Hell Gate, in 6 days, 15 hours, 24 minutes, using 10 gallons lubricating oil, 222 gallons gasoline, at Long Branch, the last 1866.4 miles without stopping the motor—records all the way.

THE OSCAR LEAR AUTOMOBILE CO.
COLUMBUS, OHIO

The Frayer-Miller Motor Car Co.
Distributors for New York, New Jersey and Connecticut
Temporary Address: 941 EIGHTH AVENUE, NEW YORK

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Immediate Deliveries Guaranteed for One Year

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FLOAT FEED, AUTO-MATIC.

Perfect Mixture at all Speeds and Temperatures

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LOCKSWITCH
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If you wish to buy or sell a second hand car, see Motor Bureau page 16.

For valuable information on Jump Spark Ignition

ADDRESS

C. L. ALTEMUS & CO.
The Bourse
Philadelphia, Pa.

Member National Assn. Eng. & Boat Manufacturers

MODERN MOTOR CARS

(Mercedes)

(Continued from page 79.)

ou the left side, and the magneto, as well as the governor, on the right side; these auxiliary parts are separately bolted down to the crank chamber, and are driven through flexible jaw couplings that enable them to be easily removed when desired. Fitted in conjunction with the exhaust-cam shaft is a half-compression device that can be brought into play by a handle in front of the radiator; it causes the exhaust valves to be lifted during the first part of the compression strokes. The governor, which is of the centrifugal type, lies between the magneto and the spur wheel which drives them; it is not enclosed in any way, and its sliding sleeve is connected up in a simple manner with the throttle valve. As usual, the igniters are actuated from the same cam shaft as the inlet valves, and the rock shaft by which they are simultaneously "timed" lies along, outside, the crank chamber.

Apart from "timing" the ignition—which is effected by the smaller hand lever above the steering wheel—the entire control of the engine is by the throttle valve. The governor normally tends to close it automatically as the speed increases, but it can be opened to the desired extent by the hand or the foot of the driver. The accelerator pedal lies in a convenient position for the left foot, and the corresponding hand lever is above the steering wheel. There is no connection whatever between the clutch pedal and the throttle valve.

In Fig. 8 the position of the pressure valve is well demonstrated, and in Fig. 9 it will be seen that the necessary connection between the pressure valve and the exhaust is made by a pipe leading into the rear cylinder casting close up beneath the rearmost exhaust valve.

Not only is the large twelve-feed lubricator—in the centre of the dashboard—fed by pressure from the supply tank at the side of the car, but a feed pipe is now led from that tank to the hand-operated lubricator, also. In this way, it is no longer necessary to fill the glass container by hand, for the oil flows into it directly the cock is opened. The lubricator is of that type in which a hand pump is fitted for forcing oil into the crank chamber. From the large multiple-feed lubricator, the supply to which is controlled by a central cock, the pipes are led to every bearing on the engine, and also to the steering gear.

DETROIT TO NEW YORK IN A PUNGS-FINCH

MR. E. B. FINCH, of the Pungs-Finch Auto Co., accompanied by Mr. Harry F. George, of Detroit, recently drove a 22 m.p., model "F," Pungs-Finch car from Detroit to New York, the odometer registering 880 miles, and while no attempt was made at record breaking, the run was made in exactly 48 hours, running time, which is believed to be record time between the two cities. Absolutely no repairs or adjustments of any kind were made on the way, except replacing two springs, broken through accident, and tire repairs.

The main object of this trip was to try out new parts for the Pungs-Finch cars, and was very gratifying. The car was equipped with a regular 22 m.p. stock motor.

The route followed was through Cleveland, Buffalo, Geneva, Seneca Falls, Syracuse, Albany and East Bank of the Hudson.



MOTOR STATION DIRECTORY

(Continued from page 67.)

New Rochelle, N. Y.
WALLACE BROS. GARAGE, 245-47 Huguenot St. 'Phone 352 W, New Rochelle.

Nashville, Tenn.
DUNCAN R. DORRIS, 235 Spruce St.

Newport, R. I.
NEW YORK TRANSPORTATION CO., 19 Downing Street.

Newton Highlands, Mass.
WOODWORTH BROS.

Olean, N. Y.
CLOSE CYCLE & MOTOR CO.

Oyster Bay, L. I., N. Y.
ELLIOTT TAPPEN.

Palo Alto, Cal.
COLUMBIA CYCLERY CO.

Paterson, N. J.
PATERSON AUTOMOBILE EXCHANGE, 10-12 Crosby Pl., opposite N. Y. S. & W. Depot.

Philadelphia, Pa.
AUTOMOBILE SCHOOL OF PHILADELPHIA, 302 North Broad St. 'Phone.
KEYSTONE MOTOR CAR CO., 258 N. Broad St.
THE MOTOR SHOP (Inc.), 317-319 No. Broad St.

Pittsburg, Pa.
THE AUTO TRAFFIC CO., 401 Liberty Bank Bldg.

Plainfield, N. J.
PLAINFIELD AUTO GARAGE, 111 Washington Hall.

Portland, Me.
CONGRESS SQUARE AUTOMOBILE STATION, 18 Forest Ave.

Quincy, Ill.
QUINCY AUTOMOBILE CO.

Reading, Mass.
H. E. AUSTIN.

Richmond, Indiana
M. C. HENLEY & SON.

Rochester, N. H.
J. H. DUNTLY.

Rutland, Vt.
COOLIDGE CYCLE CO.

San Diego, Cal.
HUNT & HUNT, 2nd and E. Sts.

Savannah, Ga.
T. A. BEYSON, 242 Bees St., and 3 and 7 Perry St.

Somerville, N. J.
GARRETSON CYCLE CO., 94 Main St.

South Bend, Ind.
W. H. BARGER, 1246-48 Lafayette St.
E. C. BRIGGS, 127 E. Jefferson St.

Stamford, Conn.
MECHALEY BROS., 34 Summer St.

Stanley Depot, Ct.
CHAS. GILBERT.

St. Louis, Mo.
SOUTH SIDE AUTO GARAGE, 3 S. Grand Ave.
CAPEN MOTOR CAR COMPANY, 4739 McPherson Ave., St. Louis, Mo.

Summit, N. J.
CHESTER C. HENRY, Springfield Ave.

Syracuse, N. Y.
AMOS PIERCE AUTOMOBILE CO.

Tarrytown, N. Y.
NICOLAS KOENIG, 179 West Main St.; Telephone 144 R.

Taunton, Mass.
H. CARLOW & CO., 1 and 3 Howard St.

Toledo, Ohio
THE WEED GARAGE, 235 Ontario St.

Union City, Conn.
H. Y. ENSIGN, 49 Prospect St.

Utica, N. Y.
CHAS. H. CHILDS, 12-18 Lafayette St.
MILLER MUNDY CO., 26 to 30 Elizabeth St.

Vallejo, Cal.
VALLEJO AUTO EXCHANGE, P. O. Box 427.

Vineland, N. J.
C. W. PEARSON, 625 Landis Ave.

Warren, Ohio
GEO. C. SCHEMMEL AUTO GARAGE.

Waterbury, Conn.
JOHN YOUMANS, 231 S. Main St.
E. H. TOWLE & CO., West Main St.

Wheeling, W. Va.
JASON G. STAMP.

Wilkesbarre, Pa.
AUTO MACHINE & REPAIR CO., 176 South Main St.

Williston, Md.
THE WILLISTON CYCLE AGENCY.

Worcester, Mass.
ROBINSON'S AUTOMOBILE STATION, Pleasant St., opp. Chestnut St.
PALACE AUTOMOBILE STATION, 671-673 Main Street.

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WANTED

A MAN WITH A NEED

If you want to buy anything, if you want to sell anything, if you want a Chauffeur or Mechanician, if you want anything in the world of motoring, you want

MOTOR MESSENGERS

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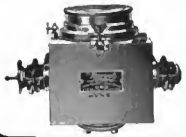
Gas ready when you want it

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The Neverout

Patent

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Makes gas only as needed, but instantly produces a steady, penetrating, intensely white flame as soon as lighted.

Extinguish it and generation stops at once.

No gas confined under pressure, no danger of explosion; no odor, no waste, no trouble or bother of any sort.

Costs less than one-half cent per hour. Keeps carbide intact and uses every bit of it.

This gas producer is bound to grow as famous as



No. 12. Non-breakable Nonpin Mirror Lens Searchlight Equipment, with swinging bracket. Frame is of steel gas

The Neverout

TRADE MARK

Mirror Lens Searchlight

which is without an equal for projecting power, and is besides the strongest and handsomest searchlight made.

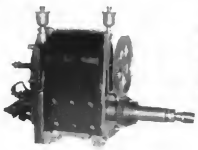
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"THE use of a magneto on a modern motor car may be said to be a mark of a high degree, especially so if a high-tension system is employed." —*Motor.*



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Corner 42d Street, Bristol Building

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Northern

"Noiseless and Dustless"



18 h. p. Touring Car, $1700
Limousine, - - 2500
Runabout, 7 h. p. - 650

THE silent operation and superb finish of the Northern Touring Car place it in advance and make it more desirable than cars sold for twice the money. Mechanically the Northern has no superior.

Its dust-proof, oil-retaining mechanism, three-point motor support, full elliptic springs and perfect distribution of weight, have won its reputation as the *"quietest and easiest running"* car in the world. It is the only car at the price equipped with four-inch tires.

Write for catalogue and complete information about 1906 models.

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Detroit, Mich., U. S. A.

Member Association Licensed Automobile Manufacturers

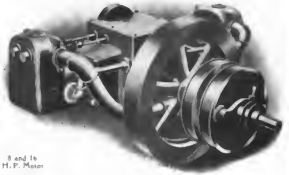
PROMPT DELIVERIES

And a *yearly guarantee* are features *characteristic* of my business—manufacturing reliable Engines, Transmissions, Commutators, etc.

¶ I guarantee motors to develop *full rate power* on the brake—all parts are interchangeable. ¶ My planetary transmission is *considered* the *strongest* on the market—chain and shaft drive.

¶ To introduce my *new* commutator I allow 30 days trial.

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260 South Front Street, Grand Rapids, Mich.



8 and 16 H. P. Motor



Planetary Transmission,



Commutator

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Modern—Highest Grade —A model of Fireproof construction.

A favorite rendezvous for Automobile Tourists

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Rates $1.50 per day and upward

Wire Reservations at our Expense

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THE "AMERICAN"
STORAGE BATTERY FOR IGNITION
— MONITOR TYPE —



VOLTAGE—2 AND 4 CAPACITY—30 AMPERE-HOURS PRICES—$8.50, $9.00, $15.00
OTHER SIZES—$5.50 to $25.00.

CATALOGUE ON REQUEST. ESTABLISHED 1888.

AMERICAN BATTERY COMPANY
120 SOUTH CLINTON ST., CHICAGO, ILL.

1906 Models Now Ready



MODEL E, 30 H. P. GLIDE

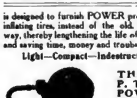
GLIDE Model E is a 30 h. p. car with a vertical four-cylinder motor. Bevel gear drive. Graceful design and beautiful finish. Our new Model F is an 18 h. p. car with a two-cylinder horizontal opposed motor. Both of these cars are winners in their respective classes. Advance catalogues are now ready.

THE BARTHOLOMEW CO.
413 BRADLEY AVE. PEORIA, ILL.
Member American Motor Car Manufacturers' Association.

THE P. T. C. POWER TIRE PUMP

is designed to furnish POWER pressure for inflating tires, instead of the old, laborious way, thereby lengthening the life of the tires, and saving time, money and trouble.

Light—Compact—Indestructible



THE P. T. C. POWER TIRE PUMP



is easily attached to the front of any car. Once attached, always in place. Started and stopped by simply turning a thumb-screw. Nothing to do but watch the gauge, and stop when proper pressure is obtained. Circular describing it in detail furnished on application. Write for it.

The Pacific Tucking & Mfg. Co., 471-473 18th. ST. BROOKLYN, N. Y.

NEW RUBBER TRUST ABROAD

A new combination has been formed between German and Austrian parties for the manufacture of rubber. The new enterprise is in the hands of General Director Hansen, of the Hanover Rubber Company. Another outbreak of the rubber makers is expected, for the rivalry that was settled by an agreement a year ago is ready to be renewed. Even the present rubber trust is threatened, as the agreement among the contracting parties determines that the trust shall cease to exist as soon as a new factory has been erected to compete with it. Most of the existing stock companies engaged in the rubber industry sustained losses during the year 1904, or at least were obliged to pay much lower dividends than previously, and the present year has up till now brought no relief. The prices of raw rubber have risen twenty-five to forty per cent.; for rubber bands, etc., an increase in price of but ten per cent. has been secured. The trade in staple articles—balls, shoes, etc—shows an unfavorable result; not only that the sales are small, but also that the existing prices allow of almost no profit. On account of the motor car the sale of pneumatic tires has somewhat increased, but here, too, as well as in the rubber-shoe branch, the competition of other countries has made the profit small. The sale of bicycle tires has increased.

MOTOR BOATS WANTED

Consul-General Schuyler, of Bangkok, reports an opening in Siam for steam launches, motor-boats, etc. He writes:

"The city of Bangkok has more launches plying upon its waters than any other city in the Orient. These launches are for the most part heavy, clumsy Chinese-built teakwood boats, fitted with old-fashioned steam engines burning wood. There is undoubtedly a great future here for the light-motor launch of American make, which ought to be introduced without delay. Motors using kerosene (petrol) would be the best type, as that can be obtained all over the country, while engines using gasoline can only be employed near Bangkok. Manufacturers of launches and engines are requested to send catalogues of motor launches and boats for distribution and for use in the catalogue library of this consulate general, such catalogues to include details of fittings, separate motors without boats, terms of sale and prices."

SUCTION GAS PRODUCERS

Consul Halstead, of Birmingham, England, reports successful efforts with suction gas producers and economic engines in England. He writes:

"A short time ago I reported the successful use by a large English engineering firm of a suction-gas producer and gas engine as motive power for a small yacht, and in a dispatch of a later date I wrote of a compressed gas-driven canal boat. A recent number of *Motor Traction* tells of another gas-driven barge, this one built by Messrs. John I. Thornycroft, Limited, but equipped on the same system—the Emile Capitaine patents—as their yacht I have mentioned above. For the small yacht it was stated that one horsepower per hour could be produced by one pound of anthracite, and it is claimed in this article in *Motor Traction* that sufficient fuel can be carried on board the barge for more than a day's run. In the case of the yacht the gas producer and engine were said to occupy only twelve feet six inches by nine feet four inches floor space, with six feet eight inches for head-room, the hopper carrying enough fuel for a ten-hour run at from ten to twelve miles per hour. *Motor Boat* stated, in a recent issue, that Messrs. Beardmore & Co., of Glasgow, had contracted to install a suction producer and engine giving 600 horsepower in the 'Earl,' a three-masted schooner 136 feet long by twenty-three feet beam, and drawing eleven and one-half feet of water.

"Next in importance to the increased use of waste blast-furnace gases —of which the largest installation I have heard of is at the Lackawanna Steel Company works, near Buffalo, where there are ten 2,000-horsepower Koerting gas engines, built by the Delavergne Engineering Company, of New York—and waste coke-oven gases, is the development for power purposes of gas producers and suction gas producers. So rapidly has gas-producer practice come to the front it has warranted the publication, and profitably, of both an American and English edition of a periodical which pays special attention to the subject, and the increasing use of gas producers for factories is causing anxiety to gas companies. The fact, therefore, that the practicability of using producers and gas engines with economy in cost of fuel and economy in room, in boats, is being demonstrated, is exceedingly important."

MOTOR CARS IN GREECE

In view of the rapid growth in the demand for first-class motor cars, and the remarkable success achieved in their construction in the United States, the following report on motor cars in Greece, from Consul Horton, of Athens, will give manufacturers an idea of the demand in that part of the world. Consul Horton writes:

"There are twelve motor cars in this consular district, or, to speak more definitely, in the city of Athens. Three of these belong to the King and the princes. His Majesty's motor car is quite a luxurious affair, and is said to have cost some 20,000 francs ($3,860). That owned by Prince Andreas was presented to him by the Czar of Russia. Most of the motor cars in use here were bought in France at a cost of from 4,000 to 10,000 francs ($772 to $1,930). Three new ones are now on their way to this country. Motor cars are classed by the tariff law as four-wheeled carriages, which (upholstered or not, used or unused) pay a duty of 300 francs ($57.90) each, besides octroi, etc."

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PHARES

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FOR AUTOMOBILES AND AUTOMOBILE BOATS

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We have issued a new illustrated catalogue de luxe of 200 pages devoted to the new imported and domestic models of automobile apparel for men and women for Fall and Winter service. Presented are garments of fur, leather, cloth and rubber, together with a comprehensive series of requisites. To you we would be pleased to mail a copy without charge.

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The Power of a CADILLAC Never Diminishes

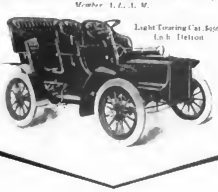
Even after a year's service it is not unusual for a Cadillac motor, when given the proper care, to develop 20 per cent. more power than originally rated. Ample reserve energy enables the Cadillac to go anywhere.

Runabout, $750; Model C, with detachable tonneau, $850; Light Touring car, $950; 4-cylinder car, $2,800; f.o.b. Detroit

Booklet S and name of nearest dealer sent upon request

CADILLAC AUTOMOBILE CO., Detroit, Mich.

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Light Touring Car, $950 f.o.b. Detroit

WHICH ROAD WILL YOU TAKE



THE LONG WAY AROUND THE SHORT WAY OVER

Equip your car with a **Brennan Motor** and you won't have to take the long way around. We invite you to investigate our motors. It won't cost you anything. Hundreds of others have and they're all taking "the short way over," too. Read what one of the many satisfied users of **Brennan Motors** says:

BRENNAN MOTOR CO. Syracuse, N. Y. Utica Steam Yacht Co. Utica, October 6, 1905

Gentlemen:

I have not received from a long boat and when I got the gear case out could get at the engine. I gave it a good inspection to find that the bearings have hardly any perceptible wear. The boat has run [illegible] hours, and I never had an out the gasoline as it runs has the same spark plugs in it with the I never have [illegible] I am pleased to say the crank bearings taken out but one [illegible] fully for engine is perfect. Have been using it for since the fall of 1903.

Yours truly,

M. P. MOELLER

BRENNAN MOTOR CO.

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Storage Battery Igniters

RECOGNIZED AS THE MOST SATISFACTORY MEANS OF IGNITION

Now used and endorsed by forty-five of the leading automobile and motor boat manufacturers.

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Can you afford to consider anything else for your 1906 car.

Write for descriptive pamphlet
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WITHERBEE IGNITER CO., 541 West 43d Street, New York

"SOOT-PROOF"
WINS

FIVE PRIZES WERE AWARDED TO THE CARS USING "SOOT-PROOF" PLUGS

"Soot-Proof" in Name and Fact

The "McMurty" Prize for the car having the least ignition trouble was awarded to a Reo, using "Soot-Proof" Plugs.

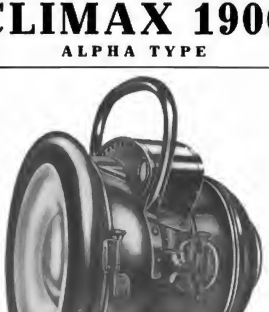
These cars covered a distance of 700 miles during the National Economy Test of the New York Motor Club, October 30th-November 4th, 1905.

These cars had absolutely no Spark Plug troubles, and the original plugs were used throughout the entire run. Thus again has the "Soot-Proof" Plug demonstrated its superiority, reliability and economy.

Non-Short-Circuiting **Self-Cleaning**

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CLIMAX 1906
ALPHA TYPE



SIBLEY & PITMAN
26 WARREN STREET, - - NEW YORK CITY

Monarch



Our 1906 Model C. is now ready for delivery.

PRICE OF RUNABOUT, $1000.00 PRICE OF RUNABOUT WITH TOP, $50.00 EXTRA.

7 H. P. AIR-COOLED RUNABOUT

Simple, Easy Running, All Parts Accessible. Speed 4-22 Miles Per Hour on High Speed Clutch. Body Rides on One Set of Springs, Machinery on Another. Planetary Transmission Two Speeds Forward and One Reverse. All Speeds Operated by One Lever.

Our Air-Cooled Engine is Absolutely Guaranteed

MONARCH AUTOMOBILE CO. - Aurora, Ills.

AGENTS

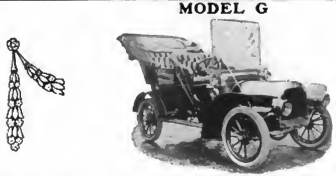
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Joseph S. Heller, 1779 Broadway, New York City.
Victor L. Kraft, 44 N. Water St., Rochester, N. Y.
D. L. Mulford, 814 N. Broad St., Philadelphia, Pa.
Auto Supply & Storage Co., 1418 Mediion Ave., Baltimore, Md.
Upton Funk, Shippensburg, Pa. Fred. K. Martin, Perth Amboy, N. J.
Ohio Pail Co., Middlefield, Ohio.
Union Automobile Co., 4601 Olive St., St. Louis, Mo.
Carl W. Hays, Lexington, Mo.
Hayden Automobile Co., 1337 Michigan Ave., Chicago, Ills.
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Moore Auto Co., Lincoln, Neb. Geo. E. Barton, 409 1st Ave., Spokane, Wash.

JACKSON
AUTOMOBILE CO.

QUALITY

Is Our Watchword—Not Quantity

MODEL G



4 cylinder, 40 H. P. cylinders, 5 in. bore, 5 in. stroke, 3 speed and reverse sliding gear transmission, 108 in. wheel base, shaft drive, lots of room, easy riding and ample power, everything of the highest grade.

MODEL C



2 cylinder, under body, chain drive, 20 H. P. cylinders, 5¼ in. bore, 5 in. stroke, 90 in. wheel base, Hill's precision oiler, the fastest car for the price in the world. This car holds the 5 mile world's record for 2 cylinder cars, 6.18⅘ on a circular track.

MODEL D



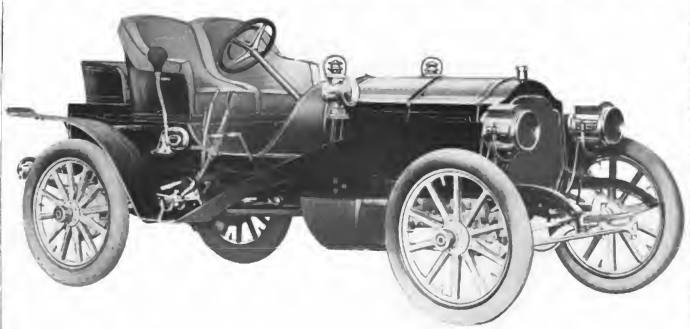
Price $1,500. 20 H. P., 100 in. wheel base, 32 in. wheels, 3½ in. tires, shaft drive, Hill's precision oiler, engine under hood.

Mr. Agent.—Now is the time to get *next*. Don't wait; our output will be sold within sixty days.

Jackson Automobile Company
JACKSON, MICHIGAN

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Packard



"Before the design of the 'Packard 24' was accepted by the Packard Company, three cars were built and driven 21,000 miles over every kind of road and grade that exists between Michigan and Massachusetts."

PACKARD MOTOR CAR CO.

DETROIT, MICH.

Member Association Licensed Automobile Manufacturers Dept. 6 New York Branch, 1540 Broadway

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GIVING ST. NICHOLAS A LIFT WITH AN OLDSMOBILE

AS foreshadowed last month our announcement of 1906 Models is sensational. It marks the coming of the two-stroke cycle car into popular favor, and the appearance on the market of a four-cylinder car having the style, quality, power and mechanical construction equal to the best imported cars, and sold at a price which places strictly high grade cars within reach of the average pocketbook.

OLDSMOBILE Model S, a rangy four-cylinder, four cycle Touring Car at $2,250.
OLDSMOBILE Model L, a two-cylinder, two-cycle Light Touring Car at $1,200.
OLDSMOBILE Model B, our famous Standard Runabout with numerous new features at $650.
OLDSMOBILE Commercial Vehicles, a complete line.

Every one of our models has successfully stood the most exacting road tests. They are the ripe product of the largest and best equipped automobile factory in the world.

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Lansing, Mich., U. S. A.

MEMBER OF ASSOCIATION LICENSED AUTOMOBILE MANUFACTURERS

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Kindly send me information regarding cars checked. I am interested.

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Model S..
Model L....
Delivery Cars.
Passenger Traffic Cars..

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Enclosed find 10 cents for which send your large Art Calendar (free from advertising and suitable for framing) for 1906. Designed by George Gibbs.

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MOTOR TALK COUPON

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LANSING, MICH.

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WINTON



The Self-starting WINTON Model K

NO more "cranking!"

Start the Car from where you comfortably sit.

You can do it now with the new Winton Model K.

Just move the Ignition Dial Lever a trifle, on top of Steering Wheel.

That finds one of the four cylinders *ready charged* with Gas, and will Spark it into action *without* "cranking."

You thus save dignity and temper.

You also save gasoline and electricity.

Because you can now shut off the motor every time you stop, and start it again when ready, *from the seat*.

This saves the motor from a lot of *needless* running when Car is standing still, waiting for something or somebody.

And a dainty *Woman* may now drive a Winton, without the intolerant necessity of "cranking" it at every stop.

* * *

But, think what this self-starting quality in a Winton Car *proves* for the Car Construction.

It proves almost *perfect compression* of Gas in the cylinders.

Because, you couldn't start the motor with an electric spark, unless there was gas in a cylinder *ready* and there since the motor last ran, under high compression.

Any flaw in the boring of the cylinder, or in the seating and fitting of the piston and its rings, would let the gas *leak out* shortly after compression if not "fired" at once.

This is where the Winton system of *grinding* the inside of cylinders, instead of *boring* them, shows its great advantage.

In *boring* a cylinder, the thin walls are likely to *spring away* from the auger, or boring tool, wherever there is a *hard* spot in the metal. This portion, when it "springs back" again, after the tool has been withdrawn, leaves a permanent elevation, or *friction spot*, for the piston to chafe against,—with a leaky place on either side of it for loss compression.

And, wherever there is a *softer* spot in the cylinder metal, the tool bores through that *too easily*, with *less expansive* pressure on that part of the wall than on surrounding places.

That creates a sort of *depression* in the wall of the cylinder, which lets gas escape past the piston.

* * *

But with *grinding* it is different.

Grinding out a cylinder brings no *expansive* pressure on its walls.

Because, instead of an auger that fills the whole interior of the cylinder, as in *boring*, the *grinding* is done by a small Emery or Carborundum wheel that revolves on a revolving arm, but on an opposite direction to that arm.

This small grinding wheel thus follows the inside wall of cylinder, and cuts away the steel with Emery, in an absolutely *true circle*.

It also leaves behind it a perfectly *smooth*, non-friction, mirror surface, instead of the coarse, wiry surface left by boring.

Every Model K Winton Cylinder is ground six to twelve times with a Carborundum wheel in this patented and effective way.

That is why Model K Winton Cylinders *hold* the gas under high compression over night, so that the motor can be started from seat in the morning without cranking.

And a Motor that will *hold* its compression like this clearly utilizes *all the efficiency* of the cylinders, and of the gasoline, electricity, and lubrication used.

A cylinder that won't hold its compression is like a leaky pail that you keep pouring gasoline into, but can't keep full, and gasoline costs money.

* * *

The cylinders of a *cheap* Car can't be *ground*, and so must be *bored* instead.

Because, *cheap* cylinders are made of comparatively *soft* metal.

The grains of Emery used in *grinding* would sink into that soft metal, and become imbedded there.

Then these grains would cut lengthwise grooves into the piston, when it worked up and down, so the gas would escape instead of being properly compressed.

But, Winton Cylinders and Winton Pistons are made of metal so hard, and so close textured, that even Emery could not become imbedded in it.

And Winton *grinding* leaves these diamond-hard cylinder walls in an absolutely "true" and smooth-as-glass condition, which eliminates friction, heat, and lost compression. The self-starting, and retained-compression, *proves* this beyond question.

All Pistons, Piston rings, Crank-shafts, Valves, Universal Couplings, and Transmission Shafts are also *ground*, like the cylinders, on the new Winton Model K.

The result is maximum *efficiency* of power from Motor to Driving Wheels, much longer *life* to the Car, and great economy of Lubrication, Gasoline, and Repair.

* * *

The New Winton Model K has—

—A Vertical 4-cylinder Motor, which is instantly accessible.

—Flexible Pneumatic Speed-Control, which gives a speed range of from 4 miles an hour to 50 miles an hour, by the mere pressure of foot on a soft spring pedal, and without touching a lever.

—Winton Twin-springs that adjust themselves to light loads, or heavy loads, on rough or smooth roads, and add length of *life* to the tires by taking all the hard bouncing off them.

—Big Tires, 34 inch by 4 inch.

—Powerful Brakes—3 of them—made with 25 per cent. larger contact surfaces than last year.

—Luxurious tonneau, roomy, springy, and upholstered superbly, with many little comfort features.

Price, $2,000, and only *one* type of Car built this season—the best that concentrated effort can produce.

Compare it with the finest 2,000 car on the market. Catalog No. 4 now ready—get a copy from—

THE WINTON MOTOR CARRIAGE CO.

CLEVELAND, O., U. S. A.

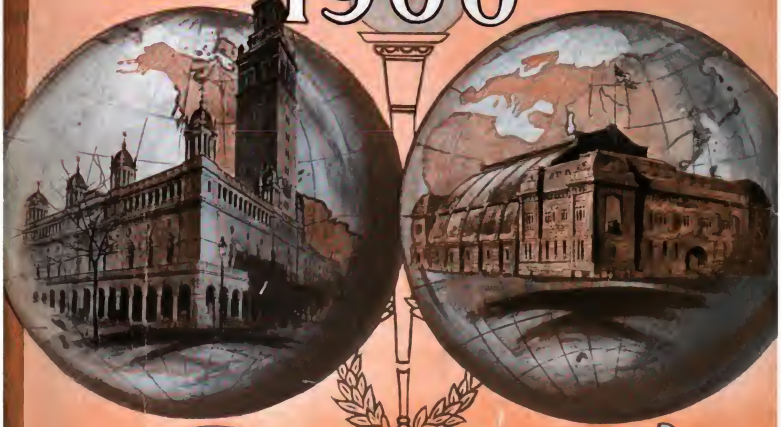
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VOL V N
25 CENTS

MOTOR

JANUARY 1906



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MoToR
1789 Broadway, New York City

FRANKLIN



Type D, four-cylinder car. Air-cooled, 20 "Franklin horse-power;" shaft drive; sliding-gear transmission; 3 speeds and reverse; new and perfect disc clutch. 4-feed oiler on the dash; side doors, 100-inch wheel-base, 4 or 5 passengers, 45 miles an hour, 1800 pounds. Full head- and tail-light equipment. $2800 f. o. b. Syracuse

Why the astonishing fact that this Franklin car, rated at 20 "Franklin horse-power," does more, on average roads, than any other car rated at 40 horse-power.

First: The real proportion of usable power is more than 20 to 40. Other cars are rated at the maximum horse-power of their engine, running *in the shop under ideal conditions.* Franklin cars are rated at the power they develop under the practical average speed *on the road at 20 miles per hour.*

Then: weight. Franklin air-cooling means a light engine and light construction throughout—no water or water-cooling apparatus; no heavy frame to carry them. At least 200 pounds saved on weight construction.

Then: little power lost between the engine and the rear wheels. The same engineering ability that designed and refined the marvelous motor has refined and saved power all over the car. Other cars lose enormous amounts of power in the clutch, transmission, joints in the shaft, bevel-gear, rear axle bearings—power is lost everywhere. In the Franklin this loss is trifling. This is a matter of fact and proof, and we have gone to the bottom of it.

Then: vibration. This is of enormous importance. It uses up power to shake a car, as it uses up power to shake your fist. A rough road reduces the power of the average car 50 per cent. or more, and a very rough road often stops the car altogether. The Franklin full elliptical spring suspension, with its flexible wood-sill, takes up the vibration, leaving the working parts free to do their work.

Not one reason, but a dozen, all thought out and worked out with the same thoroughness and disregard of precedent which invented the Franklin four-cylinder air-cooled motor, when all the other American makers said that four-cylinders were unnecessary and that air-cooling was impossible.

Send for the Franklin 1906 catalogue—by far the handsomest motor book ever made—which tells about

4-cylinder 12 h. p. Runabout, $1400
4-cylinder 12 h. p. Light Car, $1800
4-cylinder 20 h. p. Car, $2800
6-cylinder 30 h. p. Car, $4000

PRICES F. O. B. SYRACUSE, N. Y.

We exhibit at Madison Square Garden, New York, January 13-20, 1906

H. H. FRANKLIN MFG. CO., Syracuse, N. Y., *M. A. L. A. M.*

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B. MOTOR

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30 H. P., C. G. V. Limousine, Made by Hooper in London

Automobiles Charron Girardot & Voigt

Factory
Puteaux, France

FIRST GOLD MEDAL
Highest Award
3 Consecutive Years
1902-1903-1904
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C. G. V.

It is urged that orders for Landaulet and Limousine Side Entrance Cars be given at the earliest possible date in order to insure early Fall delivery

Demonstration will be given by Appointment

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"GALLIA"

1. Mileage capacity on one charge, 50-60 miles.
2. Maximum speed, 20 miles an hour.
3. Great softness of control, due to eight speeds.

By Special Appointment to H. M. the King of Spain

First Gold Medal (Highest Award) Paris, Salon 1903-1904-1905

4. Light weight, 4,000 lbs.
5. Combination of elegance and comfort.
6. Great clearance, due to batteries not located under chassis.

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Immediate delivery of 14-20 and 24-32 H.P. cars fitted with the finest closed bodies

Repair Shop for Mors Cars. Complete stock of replacements

E. LILLIE, Gen'l Mgr. ***Phone 3777 Plaza***

Intending purchasers will find a demonstration of the *new Mors cars* very interesting Exhibited at 69th Regiment Armory Show only

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Elmore Announcement

During the New York and Chicago Automobile Shows, 1905, we were approached by hundreds of automobile owners, saying, "If you people would only put out a four-cylinder, 2-cycle car, you would simply have the rest beat out of sight. It would be practically the same as an eight-cylinder of the four-cycle type, with about one-fourth the complication, and as steady running as a clock." Well, we have built the four-cylinder and it is all you expected, and more. You may have already heard this from persons who have seen and ridden in it, but you have never heard us say so. We, therefore, take this occasion to announce that it is our firm conviction that not only have we exceeded the most sanguine expectations of our friends, but that in all essential points we have the best four-cylinder car ever built.

Our two-cylinder, 2-cycle car is a worthy successor to our Model 11, which, for reliability, as is well known, has never been excelled. It is in the details of construction that we have made our great advance, and in changing from chain to shaft drive we accede to the popular demand for a two-cylinder car of that type. Among the details we have improved is in using a new planetary gear running in oil, a popular make of circuit breaker, heads cast solid with cylinder, and on both cars we use the famous Hill Precision Oiler. But, as said above, there are so many things we want to talk to you about that we hope you will at once get in communication with us.

We have made so many improvements on our 1906 models that we have not the space to speak of them here, but our literature will explain them all in such a manner that you will readily see we have a car with the exact features that have been talked of for years as being most desirable, but are impractical on any four-cycle car on account of complication, rhythm of motion, power, etc., but which come perfectly natural to our 2-cycle. The action and power of an eight-cylinder car with one-fourth the complication does it all. Ask for literature.

ELMORE MFG. CO.

CLYDE, OHIO

NOTE:---Will exhibit in New York City at Madison Square Garden ONLY

Members Association Licensed Automobile Manufacturers

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"The Maxwell"



"Perfectly Simple, Simply Perfect"

16 H.P. Touring Car $1,450

The essential requirements of a successful automobile are:

First, CAPABILITY **Third, DURABILITY**
Second, RELIABILITY **Fourth, ACCESSIBILITY**

All the above characteristics will be found strongly developed in the MAXWELL motor cars. They are the causes which have operated to so phenomenally popularize them.

They are always ready, always go and always come home

The transmission and multiple disc clutch running on oil, the sure lubrication provided by the MAXWELL perfect oiling system, the almost entire absence of vibration, the smooth running qualities of every moving part and the high power for weight, produce a car the capability and reliability of which is equal to motor cars of much greater rated horse power and higher prices.

The **three-point suspension** method of supporting the motor in the frame, resulting in the elimination of strains, **the correctly proportioned strength, the long bearings, the metal body,** results in a car that will last a lifetime.

The motor being placed up front, under the hood, results in every part of the motor and transmission being accessible for adjustment and examination when the hood and transmission case cover are removed.

To the man who wishes a car that he can trust, one that will carry him over any grade of road in any weather, year in and year out, with practically no vibration, little noise and perfect safety; a car that has been built to meet the requirements of the average American Motorist over the average American Roads, and which DOES meet them; in short, to one who wishes an automobile in which there is "nothing to do but ride;" to such a man the MAXWELL is a realization of his ideal.

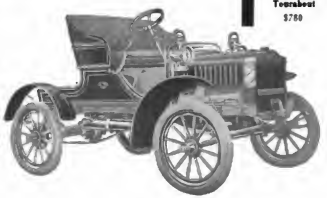
The Agency field is filling fast. If you contemplate applying for a Maxwell Agency better do it now.

MAXWELL-BRISCOE MOTOR CO., TARRYTOWN, N. Y.
Member of American Motor Car Manufacturers' Association.

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All other territory direct to factory.

16 H.P. Tourabout $780



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DUSTLESS MOTOR CAR
MADE IN HOLLAND

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20-24 H. P. TOURING CAR

Ready for delivery 15-20 H. P., 20-24 H. P., 32-40 H. P. cars fitted as Touring Car or with Limousine, Landaulet or Canopy tops. $4500 to $7500.

MOTOR—4 cylinder. Moulded in pairs. DRIVE—shaft, bevel gear.

All gears cut out of solid nickel steel, which we guarantee as unbreakable, making front axle only forging on machine.

Dustless—No Vibration—Most Accessible and Simple—Noiseless

Used exclusively by Sir T. Lipton, Earl of Shrewsbury and many other prominent foreigners.

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To be exhibited in A. C. A. Show—January 13-20

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The Lozier Motor Car High-Grade Absolutely



117" Wheel-base 36" Wheels Type C 1906 Model

TURNING THEM OUT

—not by the mile, nor by the hundred—but one at a time—three times a week. That is how uniformly high-grade construction is assured in The LOZIER Motor Cars. And each car is perfect, or it would not be turned out—it would be turned down. We spent nineteen months in the most thoroughly exhaustive experimenting before we completed our first car, which appeared in August, 1904, and added to our sum of knowledge for ten months more before our first delivery was made—in June, 1905; and we felt then, as others are realizing now, that our tireless efforts to produce the very best before it was given to the public had landed us at the first jump right at the top, with a car that is so vastly superior to any other American make, and so certainly the equal of the best of the foreign product, that, with a few other American manufacturers following the LOZIER lead, the day of the foreign motor car in the American market will soon be over. Too great haste in building, and an overmastering desire for quick returns and large profits, have not given American workmanship a chance to assert its superiority. We were in no haste to announce The LOZIER Motor Cars, nor are we in a hurry about turning them out—we are not slow by any means, we are merely sure—for the LOZIER kind of high-grade construction demands time and care. We have said that LOZIER Motor Cars are equal to the best of the foreign product—we might go further and assert that they are better—for if they are equal to them in every other point and superior to them in at least one, it follows that The LOZIER Motor Cars are the best in the world—and in the hardened and ground crank-shaft (turned, hardened and ground on its own centers), we claim a superior point in correct construction that is not to be found in any other car—foreign or domestic. We have other points besides. In price, our Limousines, Landaulets and Touring Cars are comparatively high—and they ought to be; for they cost money to build—as we build them—and good construction is everything. Call and see them or write for information and literature.



Limousines, Landaulets, Touring Cars Now Delivering



For Specifications, See Supplement Pages in This Number

The LOZIER MOTOR CO.

Fifty-fifth Street and Broadway, New York City

(See us at the Automobile Show, 69th Regiment Armory, Jan. 13th to 20th, 1906)

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We will Exhibit in Madison Square Garden Automobile Show January 13-20. Space No. 39.

The "Matheson" touring car is designed to compete principally with the very finest and highest priced cars of foreign make. Its exceptional qualities and superior operation can only be fully appreciated by *actual comparison* with others, *part for part*, and by *actual long-distance road demonstration*. It is, without any exception, far and away the most thoroughly mechanical, the strongest built, the most powerful, the fastest, the handsomest and the most completely equipped car on the market to-day.



CHARACTERISTIC FEATURES:

Self-starting from the seat.
Make-and-break ignition with magneto.
Four-cylinder vertical engine.
All valves in the head mechanically operated.
Valves never require regrinding.
All valve-actuating mechanism, on top of engine quickly accessible.
Absence of Vibration
Noiseless in operation.
Automatic, wide-range, multiple-spray carburetor; will stay adjusted and vaporize any grade of gasolene.
Automatic speed control by governor.
Automatic lubrication, multiple, positive, force feed.
Clutch, multiple-disc, metal to metal. Will run thousands of miles without adjusting.
Sliding-gear transmission, chrome nickel steel.
Hess-Bright (imported) ball bearings on transmission shafts, differential shafts, steering knuckles, and in clutch actuating mechanism.
Roller bearings on all wheels.
Extra large bearings throughout, insuring long life.
Double Chain drive.

Four especially powerful brakes.
Hill-pawl prevents car backing down grade.
Irreversible steering gear.
Axles, special nickel-steel forgings; I-beam pattern.
Nickel-steel frame, cold rolled pressed.
Flexible reciprocating rotary spring suspension, eliminating all torsional strains on front and rear springs.
Radiator, honeycomb type.
Gasolene tank, capacity 20 gallons.
Long half-elliptic springs front and rear.
Aluminum pan underneath car.
Tires, 36 x 4 inches front; 36 x 4½ inches rear.
Wheel base, 40-45 H. P., 112 inches. 60-65 H. P., 118 inches.
Side-entrance aluminum bodies, superbly finished; the unparalleled production of J. M. Quimby & Co. and Moore-Munger Co., luxuriously upholstered.

"America's Finest Motor Car"
One Year Guarantee
"Matheson"
40-45 H. P. $6,000 60-65 H. P. $7,500
With Complete Equipment Below

Weight, 40-45 H. P., 2,960 lbs.; 60-65 H. P., 3,160 lbs.
Speed guaranteed; 40-45 H. P.; 60 miles per hour. 60-65 H. P., 70 miles per hour. Geared for greater speed, if desired.

Our Complete Equipment Consists of

Cape-Carte top, Storm curtains, Standing glass front, Detachable folding seats, with lazy backs, Foot cushions, Mats front and rear, Large leather wallet, Toilet set of comb, brush, mirror, whisk broom and soap case, Tool and accessory lock drawers, Folding baggage rack, Tire irons for carrying extra tires at side of car, Tire covers, waterproof, Coat rail, Truffault-Hartford shock absorbers, Acetylene generator or gas tank, Acetylene headlights, oil side lamps, tail lamp, Large dragon horn, Gabriel horn, Gasolene gauge, Gradometer, Reserve tank lubricating oil, Jones Odometer-Speedometer, Complete set tools and tire repair outfit, Water-gauge, Dashboard 8-day clock, Monogram on doors, Extra parts, etc.

Complete catalogue giving full details mailed upon request

MATHESON MOTOR CAR CO. - - - WILKES-BARRE, PENN.
(Formerly Holyoke, Mass.)
Member Association Licensed Automobile Manufacturers.
N. B.—Our new factory is one of the largest and most modern automobile plants in the world.

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OLDSMOBILE



PALACE TOURING CAR

Model "S" -- Price, $2,250

It is only necessary to enumerate the different features of our Palace Touring Car to convince the man who knows automobiles of the sound judgment and thorough experience upon which its construction is based. To convince the most skeptical of its touring qualities, a practical demonstration is irresistible. In every line, at every point, it is "there with the goods."

The four-cylinder, vertical, water-cooled motor easily develops 24 to 28 horse power. Cylinders 4¼ inch. bore by 4¼ inch. stroke. All pistons are carefully ground and "run in" with a belt to insure accurate fit. The silent running qualities of the car are made possible by the perfect working of the motor, the careful adjustment of all parts and the muffler arranged longitudinally beneath the side of the car. The steering is through a worm and nut mechanism and has been thoroughly tested, and every possible weakness strengthened in order to insure absolute safety in this all-important part. A few of the other features are the careful balancing of parts, transmission, the brakes, the bevel gear drive, the axles, etc. We invite your further inquiry.

OLDS MOTOR WORKS

Lansing, Mich., U. S. A.

MEMBER OF ASSOCIATION LICENSED AUTOMOBILE MANUFACTURERS

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LANSING, MICH.

Kindly send me information regarding cars checked. I am interested.

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Model S.... Passenger Traffic Cars....
M-2 Model L....

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LANSING, MICH.

Enclosed find 10 cents for which send your large Art Calendar (free from advertising and suitable for framing) for 1906. Designed by George Fitzhugh.

M-2

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MOTOR TALK COUPON

OLDS MOTOR WORKS
LANSING, MICH.

Enclosed find 25 cents, for which have MOTOR TALK, *a magazine devoted to automobiling, sent to me for 1 year.*

M-2

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THE LARGEST AUTOMOBILE SUPPLY HOUSE IN AMERICA

The Miller Mica Spark Plug



This plug has been on the market for the past four years, and there are thousands of them in use, and is considered one of the best on the market, and is guaranteed for 90 days. Price of Standard size, $1.50 each. We can furnish any special size to fit any car on the market.

1906 Genuine DeDion Spark Plug



The DeDion spark plug has been on the market for several years and is one of the best known plugs on the market. We have sold 10,000 to one manufacturer for use on the 1906 cars. One size only, with Fernech thread. Price, $1.50 each.



D. B. PORCELAIN.

We furnish Porcelain complete with wire and binding post, as illustrated above, for repairing the 1906 DeDion spark plug. Price each, 50c.

Oleo Spark Plugs



This is the well known French spark plug and is soot proof, fastened with ⅝ inch American pipe thread and the French Metric thread. Price, each, $1.25.

Miller Oil Gun



Furnished in polished brass.

No. 1, size of barrel, 1x8 inches, price, each, $ .75
No. 2, size of barrel, 1½x9 inches, price, each, 1.25

Auto Tire Repair Kit



We furnish for tourists our vulcanizing substitute, containing ¼ pint each cement and acid cure, emery cloth and brushes in a sliding top wooden box. Price, each, $1.00.

Gauntlet Gloves



We carry a large stock of leather clothing, including wool vests at $2.50 each, leather coats $6.00 each, leather trousers $6.00 per pair, black and tanned Gauntlet gloves, fleece lined, at $2.00 per pair, and black fur gloves at $4.00 per pair.

Crescent Motor Clock

(8 Day)



This is a high grade clock especially designed and constructed for use on motor cars.

The movement is of the eight-day type, and is an accurate timepiece.

The dial is 3½ inches in diameter and has large Arabic figures which can be seen at a distance. Price, each, $6.00.

Miller's Combination Siren Horn



This is a combination of the ordinary horn and the Siren horn and the only one of the kind on the market. Special catalog mailed on request. Price of this combination horn, $40.00.

The Celebrated Brampton Chain



The accompanying illustration shows the connecting link used on the Brampton chain. This chain is made from self-hardening steel and is the strongest chain on the market. The side plates are chamfered and all parts of the chain are polished and they fit the sprockets without friction and have large open rivets. This chain is used on all high power European motor cars. We carry in stock the Standard sizes to fit American cars at the same price as the American made chains.

Big Four Goggle



The above illustration shows our Big Four Motor Goggle which is one of the most popular goggles on the market. It is made of the best material with ground glasses goggle which has recently been put on the market at a lower price. Price of the original Big Four Goggle, $1.50 per pair. We also carry in stock 20 other different styles of goggles which are all imported.



Anti-Freeze Compound

Ten pounds of this compound added to two gallons of water will not freeze at 10 degrees below zero. Price of 10 pound can, $1.00.



French Tale

We furnish French Tale packed in one pound air-tight metal cans. This tale should be used in putting inner tubes in the cases, and extra inner tubes carried on the car or laid away for the winter should be packed in our inner tube protector with a liberal quantity of French Tale. Price of tube protector, $1.00 each, price of French Tale, 15c. per can.

"La Bassoon" Horns



This is one of the latest ideas in a horn and is entirely new. You will notice from the cut that this horn is made with an extra coil in the body of the horn similar to "La Tuba." This extra coil has the result of producing a very deep and musical tone. All our horns are spun from heavy brass and are highly polished. The illustration shows the adjustable bracket fitted to both horn and tube so that they may be attached to any kind of a car and in any position desired. The reeds and bulbs are guaranteed for one year.

No. 12 L. B. Diameter of bell 7 inches. Polished brass only. Complete with 40-inch flexible tube and screen, $9.50.

No. 14 L. B. Same as No. 12, except diameter of bell 6½ inches. Price, complete, $8.00.

La Tuba Horn



This is another one of the latest (double bend) style of horns, similar to La Bassoon. Fitted with adjustable brackets and produces a deep and lasting tone. Three sizes, complete with tube. Prices each, 7.00, $9.00, $10.50.

No. 8, Our Leader



This horn is fitted with 40-inch tube, screen and adjustable brackets. Diameter of bell, 5¾ inches. Furnished in polished brass and nickel plated. Price, complete as above, $4.50.

Automobile Jewelry



Charm No. 5361. Full size

Charm Nos. 5347 and 5348 Full size

We are now handling a line of Automobile Jewelry, consisting of watch charms, watch fobs, ladies' hat pins in sterling silver and rolled gold plate, designed and copied from automobiles and automobile parts, such as lamps, horns, wheels, etc. Catalogue mailed on request.

We will exhibit at the Automobile Show held by the Automobile Club of America at the 69th Regiment Armory, New York City, January 13th to 20th, room "K," main floor to the right of entrance. We will exhibit at Madison Square Garden same week, space No. 139.

CATALOGUE MAILED ON REQUEST

CHAS. E. MILLER

Manufacturer, Jobber
Exporter and Importer

HOME OFFICE: 97-99-101 Reade St., New York City, N. Y.

BRANCHES: Broadway and 36th Street, NEW YORK
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ZÜST



The FAMOUS ITALIAN AUTOMOBILE

STRONGEST SIMPLEST FASTEST

1906 40-50 H·P·CHASSIS on exhibition at our private garage, 124 East 19th st·or at the Automobile Club of America's exhibit-69th Regiment Armory-Jan·15-20

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SOLE AMERICAN AGENTS
124 EAST 19th ST·
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THE FAMOUS ZÜST
MILANO-ITALIA

HAYNES

Exclusive Features that Appeal to Discriminating Buyers

Model "R." Four-Cylinder Touring Car.

Roller bearing vertical engines. Cylinders 5¾ inches by 6 inches; 50 H. P. Cast separately. Sliding gear transmission with exclusive device which prevents possibility of burring or stripping gears and permits instant change from high to lower speeds with perfect safety and without noise. Positive cooling system operated at very low cost of power. Individual and special lubrication. Carburettor, which assures perfect mixture in all temperatures and under all climatic conditions. Master Clutch that has no leather surfaces to wear. Takes hold easily and gradually without jerking. Shaft drive. Exclusive universal joints that do away with wear on pins, run in housing packed with grease. One piece nickel steel rear axle with beveled sprocket gear, driven by roller pinion; thrust eliminated, friction reduced, noiseless; all in a bath of oil. Roller bearings throughout. 108-inch wheel base. 50-inch tonneau with ample room for two folding chairs. Six to 60 miles an hour on high gear. Weight, 2,750 lbs. Price, $3,500, f. o. b. Kokomo. Full head and tail light equipment. Horn and tools.

Every important feature of the 1906 "HAYNES" roller bearing engines, master clutch, transmission, universal joints, rear axle, sprocket and roller pinion is exclusive with and found only on the "HAYNES." Every detail has been developed in the "HAYNES" factory and with exact reference to every other part. There is perfect harmony throughout the entire mechanism. This is the reason that in the "HAYNES" car there is less than 10 per cent. loss of power between the engine and rear tires. It is the reason that its cost of maintenance, upkeep, and operation is so remarkably low, and that for 14 years it has had the acknowledged reputation of being a car of pre-eminently high quality.

Its cylinders are extra large. They hold compression perfectly and give high power. When changing gears, the transmission device never allows the momentum of the fast moving car to be thrown against the power of the engine with its consequent strain to the entire mechanism, frame, and tires, a fault common to all other types of transmission. No danger of stripping gears or of gearing climbing out of casing, which constitutes the chief objection offered to large shaft-driven cars.

Roller bearings give noiseless operation. Large flexible springs insure riding ease and long life to tires. Simplicity of control, all parts immediately accessible. Honestly built. Body of cast aluminum and wood. Grey curled hair and hand buffed leather upholstering. All materials—metal or wood—are tested for strength and flexibility at double severest road requirements.

These are some reasons why the "HAYNES" gives such satisfactory service at a low rate of cost for upkeep. Others are given in our catalogue No. 17, sent prepaid upon request.

"The car that the repairman seldom sees."

The Haynes-Automobile Company

KOKOMO, INDIANA

CHICAGO: 1421 Michigan Ave. NEW YORK: 1715 Broadway

Members A. L. A. M.

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NEW YORK
MONTREAL

THE DUFF MANUFACTURING CO.

LONDON
PARIS
MOSCOW

ESTABLISHED 1883

Barrett Automobile Jacks

BARRETT'S PATENTS

are the only reliable and substantial Jacks on the market for automobile purposes. They have been adopted by every leading manufacturer and practically all operators and cover every possible condition.

The 1906 designs of SINGLE-ACTING JACKS represent the highest attainment in the line of lifting devices. They raise the car on the downward movement of the lever only—the upward stroke being perfectly free. These are the only Jacks on the market that may be conveniently operated without interference from the body of the car.



Five Sizes Various Heights

GOLD MEDALS
(Highest Award)

Louisiana Purchase Exposition
St. Louis

Lewis and Clark Exposition
Portland, Ore.



The Barrett Jacks are quick-acting, automatic lowering Jacks designed and proportioned to meet all requirements. They can be conveniently carried as part of the tool equipment and may be safely applied to any automobile without removing the passsengers.

SEND FOR 1906 CATALOG—"O-M"

Beware of Cheap Imitations of a Few of Our Old Sizes

BARRETT JACKS Manufactured EXCLUSIVELY by

THE DUFF MANUFACTURING CO.

WORKS: Allegheny, Pa. Established 1883 PITTSBURG, PA

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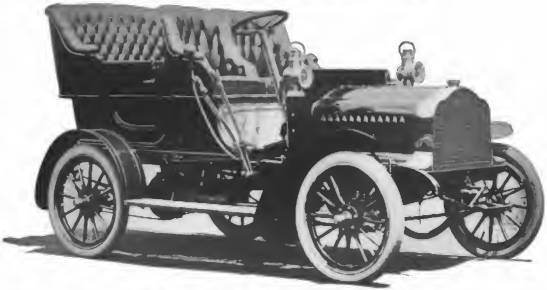
Compound



As Good as the Best Better than the Majority

Economical and Absolutely Reliable at all Seasons

12-15 H. P. Doctor's Stanhope, $1400.00



12-15 H. P. Light Touring Car, $1400.00

Duplicate of Winner in New York Motor Club's National Economy Test

E. H. V. CO. : Middletown, Conn.

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SOLE CONCESSIONAIRES for UNITED STATES and MEXICO of the DAIMLER MOTOR Co. Ltd. COVENTRY ENGLAND

BY APPOINTMENT TO H. M. THE KING.

BY APPOINTMENT TO H. R. H. THE PRINCE OF WALES.



ENGLISH DAIMLER 30-40 LIMOUSINE

In presenting the English Daimler to the American public we do so with every confidence of its meeting the most exacting demands that may be made upon it. In England "Daimlers" are driven by the most critical automobilists, and ten years' experience has proven the thorough reliability and durability of the ENGLISH DAIMLER

AGENT

DECAUVILLE AUTOMOBILE COMPANY

S. W. Cor. Broadway and Fifty-sixth Street

IN STOCK

28-36 Touring Car
28-36 Limousine
30-40 Chassis

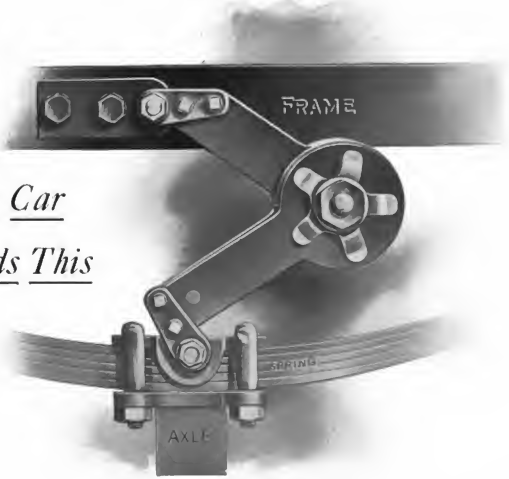
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English Daimler Cars are Licensed

English Daimler Company

New York

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Your Car

Needs This

IMPROVED

Truffault-Hartford Suspension

SEE the spring—the full force of *seven* leaves resists the downward plunge that comes with every jolt. But only the *top* leaf resists the recoil, if left unaided.

The Hartford Shock Absorber prevents breaking springs *because* it absorbs the shock and checks the rebound.

It means a car riding like a rocking chair.

It increases speed *because* it saves slowing down and prevents lost traction.

The Hartford Shock Absorber saves wear and tear of tires *because* there is less slipping and skidding.

Improved model this year—spring steel throughout—perfected locking facilities—more rigid construction of outer arms—a single center arm which prevents side lunges.

No jolting—no pitching—no skidding—no lost power. Makes all roads smooth. A single adjustment lasts a season.

Here's the testimony of Michelin, the tire expert:

"Diminishes in a marvelous degree the wear and tear on the tires."

Price for cars under 1500 lbs., $40. Over 1500 lbs., $60

PROMPT DELIVERIES ASSURED

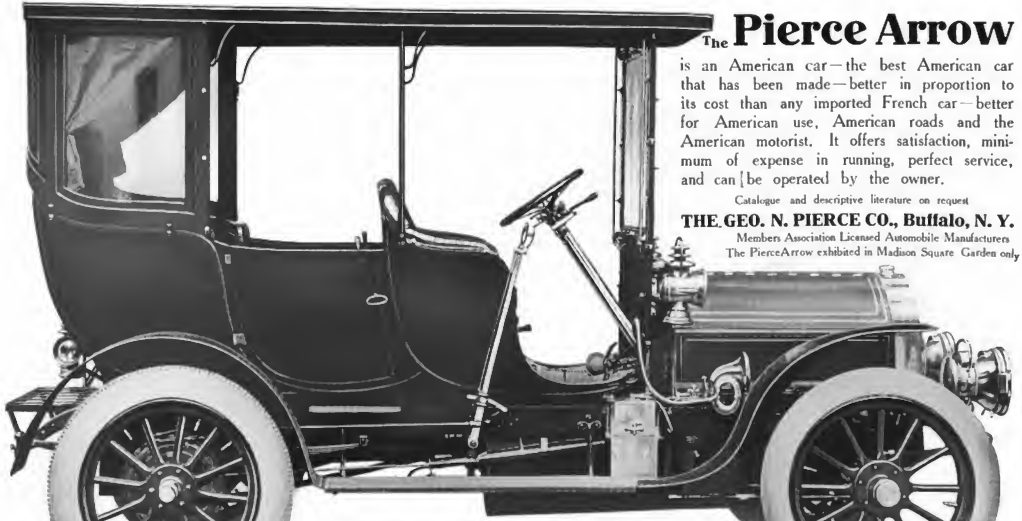
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HARTFORD SUSPENSION COMPANY

E. V. HARTFORD, President

67 VESTRY STREET - NEW YORK CITY

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The Pierce Arrow

is an American car—the best American car that has been made—better in proportion to its cost than any imported French car—better for American use, American roads and the American motorist. It offers satisfaction, minimum of expense in running, perfect service, and can be operated by the owner.

Catalogue and descriptive literature on request

THE GEO. N. PIERCE CO., Buffalo, N. Y.

Members Association Licensed Automobile Manufacturers

The PierceArrow exhibited in Madison Square Garden only

This is the Great Arrow Victoria Tonneau, 40-45 H. P., with semi-enclosed top. Price, without top, $5,000; semi-enclosed top, extra, $350; Cape Top, extra, $200. We have made the cut as large as the page so as to give you as good an impression of the car as any picture can.

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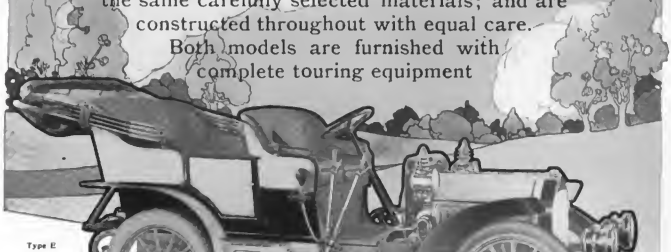
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Locomobile

"EASILY THE BEST BUILT CAR IN AMERICA"

15-20 H.P., $3,000 **30-35 H.P., $5,000**

These models are almost identical in design; contain the same carefully selected materials; and are constructed throughout with equal care. Both models are furnished with complete touring equipment



Specifications of Type "E" 15-20 H. P. *Locomobile* Price, $3,000

Equipment—5 brass lamps; horn; tire carrier; jack, tools and extra parts; locked box with trays for tools and parts; compartment carrying 4 tin cases for extra lubricants.

Motor—4-cylinder, 3¼ inch bore, 4½ inch stroke; manganese bronze base; gears enclosed. Same general type as made by us for four seasons.

Crank Shaft—Machined from one solid forging.

Cam Shafts—hardened ground forgings—one solid piece.

Carbureter—Automatic type with balanced throttle valve.

Ignition—Make-and-break system used by us for the second season. Ignition cams solid with admission cam shaft which slides in bearings to advance or retard spark.

Magneto—Low tension, out design; permanent magnets from the best makers in the world; impossible to disturb any electrical adjustments by removing or replacing magneto. Oil proof armature.

Lubricator—Large mechanical oiler. Large supply pipes.

Governor—Centrifugal type, prompt and positive in action.

Control—Gas and spark levers on steering wheel.

Clutch—Cone type with ample leather face.

Universal Joint—Between clutch and transmission.

Transmission—3 speeds and reverse; direct drive on high gear; clutch shifting mechanism, gears, bearings, and differential all encased and lubricated by same oiling system.

Drive—Double side chains; hardened sprockets.

Running Brake—Double acting type; 3½ x 10 ins. located on differential shaft, metal to metal surfaces.

Emergency Brakes—Internal expansion type, compensated. Large and powerful, metal to metal surfaces.

Sprocket Drum—Bolted to each rear wheel spoke.

Axles—"I" section axles front and rear.

Tires—32 x 4 ins. on all four wheels. Larger than the size recommended by the Tire Association.

Body—Double side entrance, seating 5; extra wide doors, fitted with top irons; color and striping optional; running boards, covered with pyramid rubber bound with brass.

Wheel Base—93 ins.

NOTE—Our 30-35 H. P. *Locomobile* Type "H," **$5,000,** is intended for those requiring greater power and greater seating capacity. The specifications are the same as those printed above with the following exceptions: Motor 4½ in. bore, 5½ in. stroke; Body seats 5 to 7 persons; Tires, 34 ins. x 4½ ins., front and rear; Wheel Base, 106 ins. Full illustrated descriptive matter of both cars on application to factory or any branch office.

For 12c. in stamps we will mail 12 souvenir postal cards showing 12 different views of the *Locomobile* running in the Vanderbilt Cup Race, making the best showing of an American car in any international contest. For 10c. in stamps we will mail a five-color poster showing the *Locomobile* finishing the race.

The *Locomobile* Company of America, Bridgeport, Conn.

NEW YORK, BROADWAY and 76th Street
PHILADELPHIA, 240 N. Broad Street

Member Association of Licensed Automobile Manufacturers

BOSTON, 15 Berkeley Street
CHICAGO, 1354 Michigan Avenue

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The Auto Supply Co. INC.

1662 BROADWAY, N.Y.

Our Annual Greeting



We do not look upon the Automobile business as a gold-brick game, or "get rich quick" scheme.

We feel confident that the Automobile has come to stay and that a great future awaits the industry.

We started early and have steadily grown with the business.

Our efforts to please our patrons regardless of dollars and cents have been fully rewarded by thousands of well satisfied customers and friends, whose good-will we value as our greatest asset.

We are determined more than ever to merit their confidence and take this opportunity to extend many thanks for past favors.







Everything for the Owner, Chauffeur and Auto

We are often surpassed in price, but never in quality, assortment or promptness.

Our stock consists of the most complete line of up-to-date SUPPLIES, AUTO APPAREL, and everything useful in the line of TOOLS.

Our SIXTH ANNUAL CATALOGUE is in the hands of the printer, and we shall be pleased to place your name on our mailing list.

Our exhibit at the Auto Show, Madison Square Garden, is space No. 126.





WE ARE THE ORIGINAL

AUTO SUPPLY COMPANY





Beware of the so called supply houses who have adopted names similar to ours in order to create confusion. Evidently the fakirs can't swindle their victims unless they trade on some one else's well established name and reputation.

We maintain no branch houses. Our only place of business is

1662 Broadway, New York





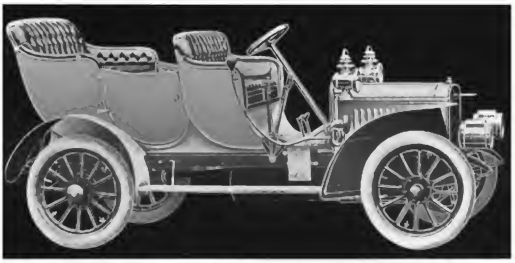
The Auto Supply Co. INC.

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THE NEW MODEL F—30-35 H.P.

Cleveland



IS NOW READY FOR IMMEDIATE DELIVERY

PRICE $3,500.00 to $5,000.00, DEPENDING UPON BODY EQUIPMENT

FIVE TO FIFTY MILES AN HOUR ON THE THIRD SPEED

SPECIFICATIONS.

ENGINE—30-35 H.P., 4-cylinder, water cooled.

IGNITION—Simms-Bosch low tension Magneto make and break spark.

TRANSMISSION—Sliding train, 3 speeds forward and one reverse.

REAR AXLE—Shaft drive, clutch driven hub Ball bearings.

FRONT AXLE—I-Beam Section. Ball bearings.

FRAME—Cold rolled pressed steel, aluminum under bonnet covering entire engine and transmission.

WHEEL BASE—104 inches.

WHEELS—Imperial whalebone, grade A second growth hickory.

TIRES—34 x 4.

VALVES—Mechanically operated, inlet and exhaust interchangeable.

CARBURETOR—Float feed, requiring no adjustment.

BRAKES—Two internal expansion, dust protected, operating on rear hubs through emergency lever, holding either forward or backward. Foot brake operates on propeller shaft. Both brakes bronze against steel.

BODY—Victoria or double phaeton, tulip side entrance.

EQUIPMENT—Two head lights, 1 generator, 2 side lights, 1 rear light, 1 horn and tools.

CLEVELAND ECONOMY is the result of the perfect harmony of design, power, strength and weight with tested material and expert workmanship, which enter into *Cleveland* construction. The *Cleveland* not only does its work well, but cheaply, so cheaply that repairs are not to be figured. *It has no weak spots*—neither our exacting tests nor hard usage on the road have evidenced them—and we guarantee every car against them.

The new 30-35 *Cleveland* Chassis is made by the Garford Company, the largest manufacturers of fine Automobile parts and Chassis in America, and is in a class by itself.

The Simms-Bosch low tension magneto ignition with automatic make and break spark, with which every important Foreign Car is equipped, is a distinct feature of the 1906 *Cleveland*.

It is original and efficient and does away with every jump spark trouble, no plugs to clean, no wires to short circuit, no batteries to go wrong, no commutator to wear out or adjust, *no* expense.

Catalogue and full information on request.

CLEVELAND MOTOR CAR COMPANY

DEPT. 1, CLEVELAND, OHIO

New York: E. B. Gallaher, 228 West 58th Street
General Eastern Distributing Agent

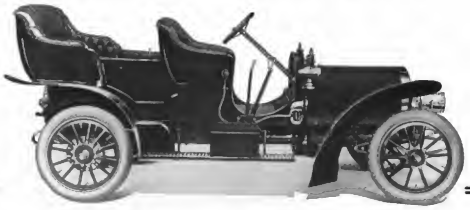
Boston: Butler Motor Car Co., 998 Boylston Street

South California: A. P. Worthington, Los Angeles

N. Y. Automobile Show, 69th Regiment Armory, space E—2. Chicago Show, 1st Regiment Armory, space A—25 & 26

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THE MARION



The New "Model Five"

This car is not an experiment. A number of them have been in commission since August last. It successfully meets the demand for a Touring Car

That is high-powered
This is moderate in price
That is as fast as the speediest
That is roomy and luxurious (seats five)
That is so simple as to enable a novice to take care of it.
That is so strongly built as to cut out the repair bills
That is so easily handled a woman can drive it at high speed
That is so light and flexible as to make tire trouble a rare experience

These problems have been intelligently and thoroughly worked out. Its four cylinders develop 28 horsepower and do it silently. The most efficient and noiseless chain drive yet devised delivers this power—all of it—directly to the spokes, without recourse to any roundabout transmission through rear axle or hubs. Total weight, 2,100 lbs. This combination of high power and light weight tells its own story of speed and "get there" through any kind of country that has wagon tracks.

Few and Simple Parts



Clean Compact Chassis

Extreme simplicity marks every feature of the mechanism, while liberal dimensions, high-class material and accurate workmanship of every part that bears strain enable it to stand up to the roughest kind of work without damage. Multiple disc clutch aud sliding gear transmission, with three speeds forward and reverse.

Two sets of powerful brakes, simple and sure steering apparatus and instantaneous responsiveness of the engine to speed regulation makes the control certain and easy.

Automatic lubricating system that is efficient, reliable and economical. Many excellent and exclusive features. Ask to be shown and we'll send our nearest agent with a Car. Seeing and riding will convince.

FOUR CYLINDERS AIR COOLED

Model Five,	*28 H. P. Touring Car,*	*$2,500*
Model Two,	*16 H. P. Touring Car,*	*1,500*
Model Four,	*16 H. P. Physician's Runabout,*	*1,250*



LOOK US UP AT THE NEW YORK AND CHICAGO SHOWS

We Have a Few Attractive Agency Opportunities Still Open

MARION MOTOR CAR COMPANY INDIANAPOLIS INDIANA

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Madison Square Garden

January 13th to 20th, 1906, inclusive.

Sixth National Automobile Show

GIVEN UNDER THE AUSPICES OF THE ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS.

The most complete line of American and Imported Cars and of Parts and Accessories ever exhibited. Madison Square Garden has never before been so beautifully and artistically decorated.

GASOLINE AUTOMOBILES

(AMERICAN)

APPERSON	Apperson Bros. Automobile Co.
AUTOCAR	Autocar Car Co.
BUICK	Buick Motor Co.
CADILLAC	Cadillac Motor Car Co.
COLUMBIA	Electric Vehicle Co.
ELMORE	Elmore Manufacturing Co.
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HEWITT	Hewitt Motor Co.
KIRK	Kirk Manufacturing Co.
KNOX	Knox Automobile Co.
LOCOMOBILE	Locomobile Co. of America
MATHESON	Matheson Motor Car Co.
NORTHERN	Northern Manufacturing Co.
OLDSMOBILE	Olds Motor Works
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WALTER CAR	Walter Automobile Co.
WALTHAM-ORIENT	Waltham Manufacturing Co.
WINTON	Winton Manufacturing Co.

(IMPORTED)

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C. G. & V	
DAIMLER (English)	Decauville Automobile Co.
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PANHARD	Smith & Mabley, Inc;
RENAULT	
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CANTANO	Cantano Elect. Tractor Co.
COLUMBIA	Electric Vehicle Co.
COLUMBUS	Columbus Buggy Co.
GALLIA	Gallia Electric Carriage Co.
POPE-WAVERLY	Pope Manufacturing Co.
STUDEBAKER	Studebaker Automobile Co.
VEHICLE EQUIPMENT	Vehicle Equipment Co.

COMMERCIAL AUTOMOBILES

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HEWITT	Hewitt Motor Co.
KNOX	Knox Automobile Co.
OLDSMOBILE	Olds Motor Works
POPE-WAVERLY	Pope Manufacturing Co.
STUDEBAKER	Studebaker Automobile Co.
VEHICLE EQUIPMENT	Vehicle Equipment Co.

All Gasoline Automobiles Exhibited at the Garden are Licensed under Geo. B. Selden's U. S. Patent No. 549,160

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MOTOR'S INFORMATION BUREAU

There are two sections to every magazine—the editorial and the advertising. Neither is more important than the other. The reader buys a magazine for the interest which the editorial section has for him, and he expects the advertising section to be an *information bureau* of his needs.

The advertising pages of this issue of MOTOR should be as carefully read as the text pages, because they are its readers' *information bureau*. If you wish to buy a motor-car, you will find the standard makes advertised in MOTOR. If you wish tires, lamps, motor-car accessories, etc., you will find only the standard makes of anything represented in MOTOR'S advertising pages.

Never hesitate to write to advertisers for more complete information than the advertisements contain. You incur no obligation, if you do. And when you do, kindly mention MOTOR.

For information about anything not in MOTOR, write us and we will see that you are informed.

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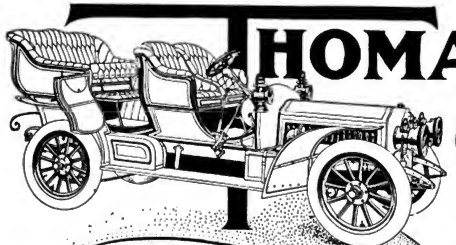
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Younger's Scotch Ale 158

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SPEED and POWER PROVEN for the 1906 THOMAS

Runs up steep grades smoothly, quietly, safely without changing gear. Made to suit American road conditions.



50-Horse Power "FLYER"

GUARANTEED TO EQUAL IN POWER AND STRUCTURE THE MOST EXPENSIVE FOREIGN PRODUCTS

The Leading American Car Approved by the World's Enthusiasts

Buffalo, N. Y., Nov. 10, 1905.

This is to certify that we, the undersigned, this day rode at the rate of 60 miles per hour with five passengers over average roads, maintaining the speed continuously in a regular stock model 1906 Thomas touring car and went up a 14% grade with five people on the high speed and on very bad roads increasing the speed all the way up the hill until we reached 40 miles per hour at the top.

The car is exceedingly smooth and quiet in operation and the clutch is extraordinarily sweet and effective.

This is the only American built stock car that within our knowledge has made 60 miles per hour on ordinary roads even without passengers.

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E. R. Thomas Buffalo
F. O. Bartlett Hartford, Ct.
C. S. Whitehead Boston
J. B. Harper, Beverly, Mass.
A. M. Spear Jr. Portland, Me.
A. S. Robinson Newport, R. I.
Raynal Godown Brooklyn, N. Y.

State New York.
County Erie

Sworn and subscribed to before me this 10th day November, 1905.

Archie D. Drake
Notary Public

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Points of Advantage in Power

—Infallible three-disc metallic clutch.
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—Larger, more flexible springs.
—Back-stop safety device.
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—New noiseless commutator, hidden wires, removable case.
—Many other valuable advantages.

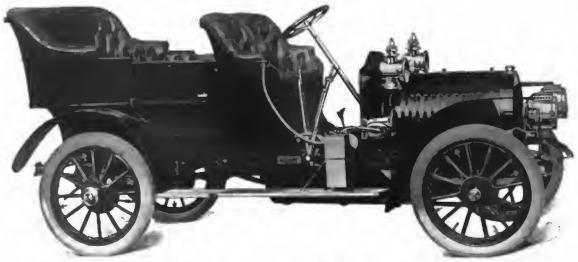
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1415 Niagara St., BUFFALO, N. Y.
Members A. L. A. M.

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The 1906 Model B Rainier

"THE PULLMAN OF AUTOMOBILES"

Absolutely the highest grade motor car built in this country, bar none, and the only car that can consistently compete with foreign machines. You will do yourself an injustice if you decide on your car without investigating this triumphant American production. New style make and break spark. Simms-Bosch Magneto, Bevel gear drive. Very large and roomy full aluminum bodies.



MODEL B RAINIER 30-35 H. P. PRICE, $4,000

Guaranteed free of repairs for one year

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Do you know that it does away entirely with the coil, the commutator, the batteries, and the spark plugs, and substitutes for all these a simple hammer and anvil, mechanically operated, which cannot get out of order.

Do you know that 90 per cent. of the foreign makers have already adopted this method?

Do you know that the RAINIER car is guaranteed not to cost one dollar for repairs within one year of purchase, unless you have an accident, and that it stands alone in this respect?

Learn all about it in our new Bulletin just issued

THE RAINIER COMPANY, - Broadway, cor. 50th Street, New York

Boston Agents: MORRISON-TYLER MOTOR CO.

Good Agents wanted in unassigned territory

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THE HEALY LEATHER COVERED TIRE

GUARANTEED

Manufactured by skilled labor under expert supervision from carefully selected leather

ONLY THE FINEST STOCK IS USED AND THE TIRE IS MOULDED BY A SPECIAL PROCESS

UNLIKE OTHER AMERICAN OR FOREIGN TIRES IT DOES NOT HEAT THE RUBBER

The covering of this one clinches underneath the rim, making it impossible for the leather to warp or peel off

THE HEALY

is positively the best leather covered tire made at any price, either in this country or abroad

We also cover old tires with anti-skid or plain treads, making them equal to new

Price List and Descriptive Circular sent upon application

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J. M. DELANEY & CO.

304 Hudson St.

NEW YORK

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Berkshire Automobiles

High Class Touring Cars

made and tested in the

Berkshire Hills



A Modern Up-To-Date American Product



16 H. P. $2,000. 25 H. P. $2,500. 40 H. P. $4,500

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Entire output will be handled direct by

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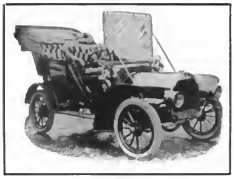
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THE JACKSON

Most Magnificent Mobile made for the Money

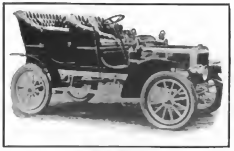
MODEL G.



$2,500

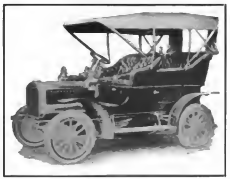
LOOK at the 1906 models at the New York Automobile Show, 69th Regiment Armory, New York, January 13-20. Observe their range—in speed, in power, and in price. Note their style, superb finish and many strong individual features, their up-to-dateness in every respect. And reflect that in 1905 a new (circular track) five mile world's record for two-cylinder cars (6:18 1-5) was established by a strictly stock Jackson car that had been previously driven over 4,000 miles on the road, besides winning more than a barrel of trophies in competitive races.

MODEL D.



$1,500

MODEL C.



$1,250

We don't pretend to build racing cars, you know, but went into a few events "just for fun"—and everything came our way!

NEW YORK CITY AGENCY

LOUIS C. HOWARD

1655 Broadway

JACKSON AUTOMOBILE COMPANY

JACKSON, MICHIGAN

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Announcement

Messrs. Hollander and Tangeman beg to announce that they have leased for ten years the modern fireproof building at the corner of 56th Street and Broadway, which will be the future American home of

FIAT

Automobiles

The building is being especially equipped for them, and they expect to take possession about January 1st.

It is planned to incorporate a new Company to be known as

THE HOL-TAN CO.

which will succeed to the Hollander and Tangeman business.

This is merely a change of name, not of interests. The President of the Company will be Mr. C. H. Tangeman; the Vice-President and Treasurer, Mr. E. R. Hollander; and the Secretary, Mr. A. G. Hamilton.

Last year it was impossible for Hollander and Tangeman to meet the demand for "FIAT" Automobiles in this country. Arrangements have been made whereby deliveries during 1906 will be greatly increased, and it is the intention to have on hand at all times the various types of the famous "FIAT" cars, ready for the road when purchased. Until removal, they invite inspection of "FIAT" cars at their old quarters.

3 AND 5 WEST 45TH STREET, NEW YORK

SOLE AMERICAN AGENTS. Licensed Importers under Selden Patent

AGENCIES:

HARRY FOSDICK CO., Boston, Mass. DOMINION AUTOMOBILE CO., Toronto and Montreal, Canada
ROCHESTER AUTOMOBILE CO., Rochester, N. Y. H. ALLEN DALLEY, Philadelphia, Pa.

"FIAT" cars will be exhibited only at Madison Square Garden Automobile Show

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THE MARMON

"A Mechanical Masterpiece"



Side View—Normal Position

A Show That Lasts All Year



One Front Wheel and Opposite Rear Wheel Each Raised Over a Foot Not a Strain Anywhere

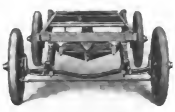
An Exhibition of Rare Mechanical Perfection

We shall demonstrate at the Armory Show, New York, and at other Shows.

But, for the man who doesn't go, we offer here an Automobile Show that needs very little explanation, even to a novice.

The Marmon is **naturally** flexible. You can see that.

It moves over rough roads with an easy, gentle sway—a very luxury of motion—unknown in any other car. You can see why. Its running gear adjusts itself instantly and **without strain** to any position which the road demands.



Front View—Normal Position

Other cars have but one frame. Some have an attachment called a sub-frame, but it is all rigid. The only flexibility attained in other cars is an uncertain variety provided by the springs and tires, and these do not eliminate jolts or sufficiently protect the costly mechanism from binding, twisting strains and ruinous friction. Anyone knows that the best of tires cannot, and do not endure the excessive and unnatural burden thrust upon them by a cumbersome, unyielding construction.



Front Wheel Raised Over a Foot, Body Level

Observe that, in the Marmon, raising one wheel does not affect the other three wheels in the slightest. The two frames operate independently of each other, due to a **patented** exclusive Marmon feature.



Rear Wheel Raised Over a Foot, Lower Frame Level

DOUBLE THREE-POINT SUSPENSION

Each frame is suspended on three **pivotal** points. The sole duty of the upper frame is to carry the luxurious, solid cast aluminum body.

The lower frame carries the entire power plant. Motor, transmission, driving shaft and live rear axle are a unit in operation—always in perfect alignment, free from twisting and binding strains, no matter how the two frames are raised, lowered or tilted. The Marmon driving shaft is therefore straight and rigid—without flexible couplings or power wasters of any sort. This means power transmission as perfect as can be had in a stationary power plant.



Note : Half Front View

The Marmon Motor is distinctive and unique in the arrangement of its four cylinders, in its efficiency and absolute dependability, and in the perfection of its air-cooling.

It has the one simple and unfailing oiling system. Main bearings, crank and **piston pin** bearings oiled from within the crank shaft, through which oil is forced under uniform pressure. 500 to 1000 miles on **less** than a gallon of oil in the engine

The Marmon is unusually stylish in appearance, superb in all its appointments and is mechanically perfect to the last degree.



Write for Booklet No. 4.

Four Cylinders Air-Cooled { **Model C, Four Passengers, $2,500**
Model D, Five Passengers, $3,000

NORDYKE & MARMON CO. (Established 1851) **Indianapolis, Ind.**

Member American Motor Car Manufacturers' Association.



Side View—Front Wheel Raised Over a Foot

RIDES LIKE A SAIL BOAT



Side View—Rear Wheel Raised Over a Foot

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THE INCOMPARABLE

WHITE

THE CAR FOR SERVICE



WHITE CATALOG

Everyone interested in automobiles, whether steam, gasolene or electric, should write to us for the new catalog of the Model "F" White steam car. It contains, first of all, a brief historical sketch, tracing the gradual perfection of the steam engine by the labors of many generations of engineers. Then is related how Rollin H. White, by the invention of an entirely new system of steam generation, whereby the boiler was eliminated, devised the first successful steam machine. This car was first offered the public in 1901.

Brief references are made throughout the catalog to the success of this first model and to the constant victories and notable achievements which every model of the White steamer has each year placed to its credit. There is also included a concise and lucid description of the White system. Finally, there are shown the various Model "F" cars—touring cars, limousines, landaulets, victorias, runabouts, extension landaulets—which we are now delivering.

A postal card to us brings the catalog by return mail.

WHITE Sewing Machine COMPANY

CLEVELAND, O.

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A New Pneumatic Tire

Made by

Firestone

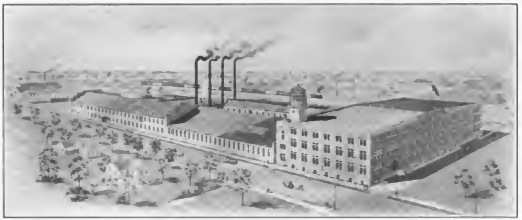
The Rubber Tire Specialists

After exhaustive experiment and careful study of the requirements of pneumatic tires, we have invented a tire which has every possible good feature of the best, with practically all of their objectionable features eliminated.

Firestone Pneumatic Tires have withstood the most exacting tests during the past two years, and we can assert positively that we have more nearly reached the point of absolute perfection than has yet been attained by pneumatic tire makers.

Firestone Tires are sightly on the wheels. Good practical common sense and accurate knowledge of the rigorous requirements of a good tire are apparent to the most casual observer. The fastening device is positive and will securely hold the tire under all conditions, and whether inflated or deflated, there is no possibility of creeping or rim cutting. The most inexperienced person can easily remove the tire in two minutes and replace it in the same time and he *cannot pinch the inner tube* because in the Firestone construction it simply *cannot be pinched.*

For many years the name FIRESTONE has stood for the highest grade of excellence in solid tires. We know the tire business in every detail. We know we have a pneumatic tire which is without a peer, a tire which will receive and merit an



"Where Firestone Tires are Made"

extensive demand. To enable us to meet any demand which may be made, we have erected immense new buildings and equipped them solely for the manufacture of pneumatic tires.

OUR FACILITIES ARE ENORMOUS. OUR TIRES ARE RIGHT.

Our successful business career has demonstrated our ability to accomplish what we undertake. We want you to know more about Firestone Tires. Study them. Examine them as closely as you please and we know you will be a Firestone customer.

Write for Illustrated Booklet.

FIRESTONE TIRE & RUBBER COMPANY

AKRON, OHIO

BRANCHES:

New York Boston Philadelphia
Chicago Detroit St. Louis

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Firestone

Side-Wire Solid Motor Tires

are a demonstrated and assured success

More than eighty-five per cent. of all commercial vehicles in operation are equipped with Firestone Tires and they are extensively used on Motor Busses, Cabs, Electric Victorias, etc.

We do not claim them to be the best KNOWN tires for these classes of vehicles without good reason, and we are able to sustain and prove every claim we make.





"Our SIDE-WIRE TIRES have made possible the success of the commercial motor vehicle of to-day, and actual tests prove them the most economical tire made.

Then why not FIRESTONE?



FIRESTONE SIDE-WIRE TIRES are made from a superb, wear-resisting quality of rubber. They are made by expert workmen in accordance with the ideas of the oldest and most successful tire maker in the business—Firestone ideas.





FIRESTONE TIRE & RUBBER COMPANY

AKRON, OHIO

BRANCHES:

New York Chicago Boston Detroit Philadelphia St. Louis

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SOLAR LAMPS

THEY CUT LIKE A KNIFE THROUGH THE GLOOM AND DARKNESS

EVERY MAN WHO DRIVES AT NIGHT MUST HAVE A GOOD CAR AND A BETTER LIGHT

LET THE SOLAR LIGHT YOUR WAY



THAT'S THE SOLAR

GET OUR BOOKLET OR ASK YOUR SUPPLY MAN

BADGER BRASS MFG. CO.
KENOSHA, WIS.

NEW YORK OFFICE, 11 WARREN ST.

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The Rapid Motor Commercial Vehicles

OUR ENTIRE ORGANIZATION HAS FROM THE VERY FIRST BEEN DEVOTED EXCLUSIVELY TO THE BUILDING OF COMMERCIAL VEHICLES

The success of "Rapid" Motor Wagons is due to the fact that they are built with the idea of giving heavy, continuous service, and carrying heavy loads.

The wagon illustrated weighs 2230 lbs. and carries 3000 lbs easily. Rear wheel measures 34 inches; front wheel 32 inches; solid tires. The double side chain drive insures a maximum of power delivered to the 2-inch solid steel axles. The cut illustrates only one of our many bodies. Size and style of body furnished to meet your requirements.

Agents can secure territory by writing me now, before all choice allotments are gone. Our new factory is a guarantee of prompt delivery.

Address C. N. HENRY, Sales Manager.

Rapid Motor Vehicle Co.

DETROIT, MICH. PONTIAC, MICH.



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LAMBERT

MODEL 8

Price - $3,000

4-cylinder, 4½ x 5 in. vertical; 34 x 4½ in. tires. Equipment; Jones Speedometer, two gas lamps with generator, two oil side lamps, tail lamp and necessary tools.

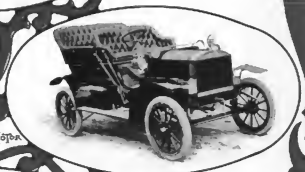


MODEL 7

Price - $2,000

34 h. p. 4-cylinder; tires 32 x 4; 13½ in. road clearance; honeycomb radiator; full equipment of lamps and necessary tools.

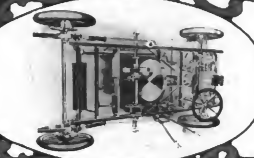




MODEL 5

Price - $1,200

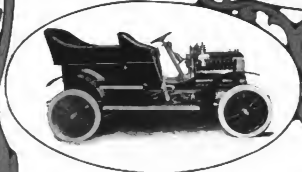
16 h. p. opposed; 30 x 3½ in. tires; 94 in. wheel base; 13 in. road clearance; honeycomb radiator.



MODEL 4

Price - $1,050

16 h. p. opposed motor; 30x3½ in. tires; high grade touring car at the price of an ordinary vehicle





MODEL "A" RUNABOUT

Price, $900. 16 h. p. opposed motor; 30 x 3½ in. tires; a car for service

We are in position to make immediate deliveries of all of the above models. Our catalogue, giving detailed descriptions of these cars is now ready for distribution. Your address, that is all.

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Members of the American Motor Car Manufacturers' Association, Chicago, Ill.

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¶ Instant control. Automatic self-locking foot throttle. Spark advance on steering post. Pedal reverse and pedal brake. Four-inch tires—notice that—it typifies the generous manner of equipment throughout.

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20 h.p. Limousine, ... **$2500**

20 h.p. Touring Car with gas and oil lamp equipment, ... **$1800**

7 h.p. Sturdy Northern Runabout with lamp equipment, ... **$650**

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Member Association Licensed Automobile Manufacturers

We will exhibit at Madison Square Garden January 13th to 20th, and at Chicago

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ECONOMICAL, NOISELESS, SPEEDY

SUCCESSFUL ALWAYS

It takes less money to operate the FRAYER-MILLER than any other car
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The first six cylinder FRAYER-MILLER has been in the hands of its purchaser Wm. Moneypenny, Jr., several months and is a pronounced success

Six Cylinder, 40 H. P., - $4,000
Four Cylinder, 25 H. P. - $3,000

Exhibiting at the show of the Automobile Club of America—69th Regiment Armory

OSCAR LEAR AUTOMOBILE COMPANY

COLUMBUS, OHIO

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The Queen



One of Our Three New Models

MOTOR—4-Cylinder—26-28-H. P.
DRIVE—Shaft-Bevel Gear.
FRAME—Pressed Steel.
WHEELS—32 x 4.
WHEEL BASE—101 inches.
TRANSMISSION—Sliding Gear.
FRONT AXLE—Solid-forged.
GROUND PARTS—All Cylinders Pistons, Piston Rings, Crank Shaft Valves, Universal Coupling and Transmission Shafts.
EQUIPMENT—Five Lamps, Horn Tools and Storage Battery.

PRICE, $2,000

We also have an 18-H. P., Two-cylinder Touring Car with Detachable Side-door Tonneau, listing at $1,100—and a Runabout 12-H. P. at $600.

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Rambler

Leaders for 1906



Model 14, $1,750

A medium weight touring car, strictly modern in design and equipment, with **20-25 H. P.,** 4 cylinder, vertical motor, sliding gear transmission and shaft drive; wheel base 106 in.; springs, semi-elliptic front, full elliptic rear, both 40 inches long; wheels 32 inches in diameter, with 3 1-2 inch tires.

Ironed for cape top and equipped with 4 inch tires, $50 additional.

A car for heavy, continuous service, equipped with **35-40 H. P.** motor, developing one full horsepower to every 70 pounds of dead weight.

Sliding gear transmission and side chain drive, with fixed rear axle.

Wheel base 112 inches; wheels 34 inches, with 4 inch tires.



Model 15. $2,500

No better car can be built at any price.

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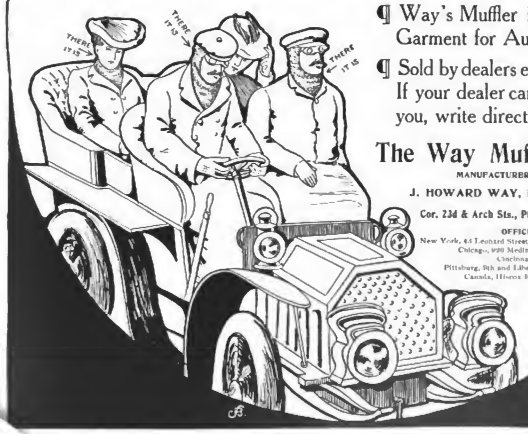
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CORBIN MOTOR VEHICLE CO



MODEL E, LIGHT TOURING CAR

24 H. P., $2,000

Four cylinder, vertical, air cooled engine, 24 H. P., mechanically operated valves. Jump spark ignition with synchronized system of distribution of the high tension current. Positive force feed lubrication. Sliding gear transmission, selective system having three speeds forward and reverse. Pressed steel frame and steel pan construction. Bevel gear drive rear axle of the floating type. Front axle I beam section, drop forged in one piece. New type worm and sector steering gear. Internal and external brakes on rear hubs. Body of graceful design, side entrance of the latest French type, roomy in proportions and luxurious in appointment. Wheel base 100 inches. Extra long springs of special design and great flexibility. Wheels 32 x 3½ inches. Weight 1800 pounds. Speed up to 45 miles per hour. Two gas lamps, generator, three oil lamps, horn and full complement of tools, constitute the equipment.

Annular Ball Bearings Are Employed Throughout

Certain Agency opportunities are still open. Representative dealers are requested to communicate with us promptly to insure early delivery of cars.

Corbin Motor Vehicle Corporation

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Wayne

An Introduction to the Wayne Cars of 1906

The appreciation accorded our cars last year warrants us in greatly increasing our capacity and in placing before the automobile trade improved types of Wayne cars. The four models we now present are the result of mature experience. They are not new and untried experiments. Each car is a distinct type of Wayne design and construction and each model has been built with a view to supplying the varied demand for high grade machines. In the Wayne cars of 1906 the automobilist will be sure to find a car suited to his needs.



Wayne Model F $3,500

MOTOR, 4 cylinder vertical, cylinders 5½ x 5 cast in pairs. Cylinders and pistons ground. Engine develops by brake test 50 H. P. Water Cooled. IGNITION, jump spark with quad coil and storage battery. TRANSMISSION, sliding gear with three speeds forward and reverse. Hess-Bright ball-bearings throughout. REAR AXLE, shaft drive floating type. FRONT AXLE, I beam drop forged, one piece, nickel steel. WHEEL BASE, 114 inches. TIRES, 34 x 4½. EQUIPMENT, includes all necessary tools of the best quality, 2 side lamps, 2 acetylene head lights with generator, tail lamp and tube horn.



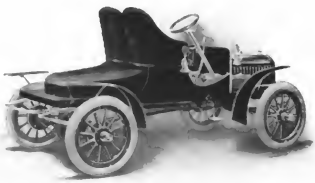
Wayne Model K $2,500

MOTOR, 4 cylinder vertical, cylinders 4¼ x 5 cast in pairs and water cooled. Engine develops by brake test 35 H. P. Cylinders and pistons ground. IGNITION same as model F. TRANSMISSION and axles same type as Model F. TIRES 32 x 4. EQUIPMENT, same as model F.



Wayne Model C $1,250

MOTOR, double opposed of the standard Wayne type, with cylinders 5¼ x 5. Engine is hung under the chassis frame and develops by brake test 20 H. P. *This is the same type of car which proved so successful last season, brought up to date and with all new improvements.* TRANSMISSION is of the planetary gear type with chain drive. CONTROL is by a single lever which engages the high speed clutch and reverse. The slow speed and brake are controlled by foot pedals. TIRES, 30 x 3½. EQUIPMENT, complete set of tools, side oil lamps, tail lamp and horn.



Wayne Model H $800

Two-passenger Runabout

MOTOR, 2 cylinder opposed under hood. Cylinders 4½ x 4 developing 14 H. P., water cooled. TRANSMISSION, planetary gears with DIRECT BEVEL GEAR DRIVE. Control the same as Model C. Wheels 28 x 3. Equipment, complete set of tools. *The strong features of this car are the extreme simplicity and accessibility of the engine and transmission. The crank case and transmission case form one casting and the entire engine can be taken apart or assembled in half an hour.*

We want agents to write us about the Wayne cars for 1906. Agency arrangements can now be made for unoccupied territory. Write while you think about it, for full particulars

WAYNE AUTOMOBILE CO., Detroit, Mich.

Member American Motor Car Manufacturers' Association, Chicago

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MOTOR

The National Monthly Magazine of Motoring

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AT BEAR WOOD, WOKINGHAM, ENGLAND—A FEW OF THE CARS AT MRS. WALTERS RECEPTION OF THE LADIES' AUTOMOBILE CLUB OF GREAT BRITAIN AND IRELAND

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VOL. V. No. 4 JANUARY, 1906



THE NEW YORK SHOWS

THOSE who know Madison Square Garden best will know it least in its motoring garb, and those who don't know the Sixty-ninth Regiment Armory will be surprised that so splendid a structure should have escaped their attention.

The annual motor-car shows of the Association of Licensed Automobile Manufacturers and of the Automobile Club of America, respectively in Madison Square Garden and in the Sixty-ninth Regiment Armory building, Twenty-sixth street and Fourth avenue, New York City, will open on Saturday, January 13, and close on Saturday, January 20, and will unquestionably be the most successful in point of view of progress shown in motor-car development and in the public interest shown.

The decorations of the Garden Show will be like madame's spring bonnet, a dream of beauty—and expense. White and gold, further enriched by other contrasting hues, will be the color scheme, and the style of decoration adopted is distinctly classic. Through the center of the building will be a row of Corinthian columns supporting a cornice surmounted by metallic globes. The columns and pilasters elsewhere about the building—under and upon the balconies—will be in the same style. The ceiling will be of azure material spangled by innumerable stars which, glittering in the blaze of thousands of electric lights, will be no mean imitation of the reality. At the entrance to the lobby a forest effect will greet the visitor, which will be carried out also in the restaurant and the basement. Further on will be the colossal figure which has adorned the advertising posters of the Garden show and beneath which a fountain will sparkle in the gleam of vari-colored lights. At the other end of the building will be a mural decoration in the form of a painting of an Italian garden scene.

The show in the Sixty-ninth Regiment Armory, under the auspices of the Automobile Club of America, will open to New Yorkers a new building for show purposes. The fact that so little is known of the structure because of its but recent completion, and also that its interior architecture is in accordance with the regulation armory construction, makes it impossible and unnecessary to describe the building. The decorations, it can be safely said, will come up to the standards of A. C. A. thoroughness.



MADISON SQUARE GARDEN. THE SCENE OF THE MOTOR-CAR SHOW OF THE ASSOCIATION OF LICENSED AUTOMOBILE MANUFACTURERS

Aside from the exhibition of motor-cars and accessories there will also be an exhibition of airships under the auspices of the Aero Club of America, which is but an offshoot of the Automobile Club of America. The Aero Club was only recently organized and has now over one hundred members. It is hoped and expected that a number of French makers will send over exhibits, and models of the ships driven by Santos Dumont, Roy Knabenshue, and other successful aeronauts of recent fame are already assured. Various types of motors used in the propulsion of these airships will also be exhibited. There will be balloons, aeroplanes, box kites, and every conceivable form of contrivance for navigating the air. The entire gymnasium of the armory with a floor space of nearly 5,000 square feet is to be devoted to the aeronautic exhibit.

The managements of the shows this year are different from those of last January, when in the top floor of the Macy building, in Herald Square, there was the Importers' Show, devoted exclusively to foreign-made cars, and in Madison Square Garden was the Domestic Show under the conjoint auspices of the National Association of Automobile Manufacturers and the Automobile Club of America. The Association of Licensed Automobile Manufacturers last January stepped in and secured the option on the Garden for the show for this year, and the Automobile Club of America subse-

(Continued on page 160)



THE SIXTY-NINTH REGIMENT ARMORY IN WHICH THE AUTOMOBILE CLUB OF AMERICA WILL HOLD ITS REGULAR ANNUAL SHOW

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Over the Cascade Mountains A-Motor

BY C. L. ROY

A JOURNEY by motor-car of 644 miles over mountains, and roads which disgrace the name, through mudholes, sagebrush, and log-barred forest trails is a thing to be remembered. I believe that this description epitomizes the tour I made recently over the Cascade Mountains; and it is a forceful sermon on good roads. The State of Washington should appropriate, say, $60,000 to $75,000 for a road to be constructed from North Bend through Snoqualmie Pass, over the Cascade Mountains, to Easton, with no grade of more than 15 per cent., which would permit of motoring trips from Seattle to North Yakima through the most beautiful scenic region in the world. Such a trip could be made comfortably in one day by motor-car, or in four days by horse and buggy. It is doubtful if there would be a highway in the world which could compare in beauty with this one I propose over the Cascades. Furthermore, and this from a commercial point of view, the numerous mines in the Snoqualmie district would also undoubtedly be greatly increased in value if the transportation facilities by motor-car of ores, supplies, etc., were made possible.

Some government surveyors in the course of this trip were met with at Lake Kitchelos, who told us that they were surveying a wagon road from Easton to the summit of Snoqualmie Pass which would not have a grade of more than 3 per cent., while some of the grades of the present road, in addition to being wretchedly surfaced, are as high as 40 per cent.

With John Kelleher, I left Seattle in a model "C" Cadillac, with a light camping outfit, provisions, all sorts of emergency contrivances, intending to make the extremely difficult journey over the Cascade Mountains to Yakima and return. I had made part of the trip before and realized that there was a most difficult task ahead of us. By shortly after nightfall we had reached Beard's ranch, fourteen miles west of Snoqualmie, without meeting with any special difficulties. Here we camped for the night, leaving early the following morning. We arrived at the first ford of the Snoqualmie River at 3 p.m., where we again pitched our tent for the night. It was not until noon the next day that we were ready ourselves to take up the most difficult part of the journey: that of pushing on to the summit, which we reached after a steady, inexpressibly rough trip of over four hours.



NEAR THE SUMMIT OF CASCADE MOUNTAINS —AN APOLOGY FOR A ROAD

Then came the run down-grade from the summit, through the Kitchelos country. Our route led us past the southern end of Lake Kitchelos, and we camped our fourth day out on the banks of the Yakima River, where, by the way, fishing was excellent and mosquitoes were abundant. In this Kitchelos country, we came across the typical pioneer, a queer personality, indeed. One such we met with who had not only never seen a motor-car, or even a picture of one, but had not heard that such a thing existed. He followed our car stealthily through the woods, peeping through the underbrush, and behaving otherwise in a strange, primitive fashion, until gradually his fears were overcome by his native curiosity and he made numerous idiotic inquiries of us, and arrived at an equally idiotic conclusion to begin the construction of a forest ranging motor-car himself.



AT GRINDSTONE WE CAME UPON A PARTY OF EMIGRANTS FROM ILLINOIS IN A TYPICAL PRAIRIE SCHOONER

On one occasion we came upon a primitive Ajax when our car became jammed in a mass of logs. All our efforts, and we are not weaklings, to assist the motor in getting us out of our difficulties, were futile. A sulky-looking teamster came along in an awkward backwoods vehicle, who cut loose a string of heathenish oaths on finding the road blocked. Slowly the light dawned upon this giant Hun or Turk, or whatever he was, that the road was barred, and that there was no way for him to pass unless the way was cleared. He rolled to the ground, strode over to our car, and, much as a child would shift a plaything, he lifted the car out of its predicament, cleared away the logs, got back into his vehicle, and "gee-haw'd" along.



WHERE AN AX CAME IN USEFUL

Our route led through Ellensburg and North Yakima, the motorists-[illegible] which latter town escorted us about eight miles on the way to Portland. We then went through Bickleton, through the great wheat country (Klickitat country), and Lyle on the Columbia River, which is at the end of the wagon road. Then we put our car on board the *Dallas City* and went along the Columbia River to Portland.

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The Ladies' Automobile Club
OF GREAT BRITAIN AND IRELAND.

By K. D'Esterre Hughes.
Secretary of the Club.

THE Ladies' Automobile Club of Great Britain and Ireland! There is much in a name, and, if the truth be told, the Ladies' Automobile Club began life with a name and nothing else.

Early in 1903 Lady Cecil Scott Montagu came to the conclusion that there were many women besides herself who loved the fascinating new sport, and that for them there should be a meeting place, where they might recite stories of wondrous roadside adventures every whit as well as did their brother motorists in the latter's Piccadilly home. Lady Cecil, having once decided that a motoring club was what English women needed, set to work in earnest to put her project before all her friends. So well did she expatiate upon its merits that on the first of October in that year the committee—who represented the entire membership list of the club with the grand sounding name—engaged a large room in the Hans Crescent Hotel for the headquarters of the new venture. Here for a period of six months the members came to read the motoring papers and to talk business, but at the end of that time it was found that the room had grown somewhat small, and from April Fool's Day, 1904, two floors of a wing of London's fashionable hotel—Claridge's—became the home of the only Ladies' Automobile Club in the world—except one in California.

The new premises are dainty and most refreshingly different from the majority of clubs, the white or general drawing-room being like a lady's boudoir. The walls of this room are panneled in white wood; the carpet is a thick green pile; the many deep and loungy chairs and sofas, covered with bright pink-tinged chintzes, invite the weary. The visitor's first exclamation is: "Oh, how pretty and comfortable—what delicious chairs!"

A wide hall with its own front door does not altogether suggest the motorist, for the first object that catches the eye on entering is one of the few tarpon to be seen in London. It is a magnificent fish and was caught off the Florida coast one winter by a member of the club who was attending the motor races.

On the right of the hall, opposite the general drawing-room, is the "Red Room," sacred to members, wherein silence is the rule and no fume of the cigarette is allowed. The name was given to it because the walls, chairs, sofas, and curtains are all of red silk tapestry. A blue green carpet, however, strikes a harmonious note, breaking the monotony of the prevailing red. Red, it is said by occultists, is the vibration of strength, and blue that of devotion, so a combination of the two must needs result in harmony, and, perhaps, accounts for the feeling of peace which seems to settle over one immediately the door is passed.

Up a wide and stately staircase must one go to find the committee-room, and here, too, are the bedrooms, all breathing an old-world air, unlooked for in the midst of London. Flowered chintzes deck the softly-cushioned chairs and lounges. The large wardrobes and bureaus, the screens—designed to keep off the smallest draught—all combine to leave nothing of that strange, dull look so generally found in rooms occupied by the passing stranger.

The clubhouse, comfortable though it be, is as much, if not more, for business as for pleasure. The *raison d'etre* of the club, as set forth on all the application forms, is to be a social center devoted to the furthering of motoring—a place where information and advice may be had on all matters pertaining to motor-vehicles.

The advantages of membership are many in consideration of a sum comparatively small, five guineas entrance fee, in addition to which the dues are five guineas per annum. It is a small sum that members are asked to pay for a first-class clubhouse, where their friends, both men and women, are always welcomed; garage facilities; special tariff for meals in Claridge's restaurant; membership of, and legal defense by, the Motor Union; the weekly receipt of the *Automobile Club Journal*—the Ladies' Automobile Club's official organ—for



GYMKHANA CONTEST AT RANELAGH ARRANGED AND CONDUCTED BY THE LADIES' AUTOMOBILE CLUB OF GREAT BRITAIN AND IRELAND

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seven shillings and six pence instead of fifteen shillings a year; the benefits of the hotels and repairers appointed by the club; and last, but by no means least, the most invaluable of blessings—the special privileges of the Automobile Club of Great Britain and Ireland—for taking cars abroad.

To the uninitiated this last does not sound very much, but to the Englishwoman who has tried taking her car into, say, France, first without, and then with, the special "customs forms," it is a boon which would not willingly be foregone. For instance, a member of the Ladies' Automobile Club proposes to run over to Paris. First of all she fills out a form stating the make and motor-power of her car, the number of cylinders, the style and color of body, the color of the upholstery, the kind and make of the tires, and the value and the weight of the vehicle; then she writes a check for a sum computed upon the weight of the car, two and a half hundredweight or under being rated at forty-nine shillings; next, the check, the description, and a photograph of the vehicle is sent to the club. In a day or two she receives a form which when presented at any of the French frontier towns admits her car without delay. When she leaves France the form must be signed by a customs official, and, after this has been returned to the club, her deposit money is refunded.

If the member is not the possessor of a French driving certificate she informs the club. An appointment is made for her with a Prefect and the examination is over and done with half an hour after reaching the Prefecture.

That the members are keen motorists and interested in every detail of the mechanism of their cars was shown last winter by the number who attended the practical demonstration lectures which were given weekly, at the club, by its engineer, Mr. R. S. Currie. These lectures were really in the form of lessons; questions were asked and answered, and notes were taken in the orthodox school-room fashion. Indeed, so popular were they that the indefatigable committee have arranged an even more complete course for the coming season.

Besides technical lectures, the members have congregated at the club on wintry afternoons to listen to well-known motorists read papers bearing on the motor-car and motoring. One of the most interesting of these was, perhaps, Captain Deasy's "Motor Mountaineering in the Alps." Captain Deasy told how he climbed the snow-covered mountains in his Martini car. Sometimes, in a city like Turin, he said, one would be nearly baked, when after a couple of hours only to find oneself above the snow line longing for thicker clothes. Every now and then, in some of the remote little villages, it was found scarcely possible for the car to scrape between two rows of houses, while, on going through more than one pass, the car had to be steered deliberately towards the unguarded verge of a precipice. Many, too, were the dangers met with in the shape of carelessly driven teams; in some places, reins being at a premium, while in others the sleepy drivers nearly managed to force the car backwards over the mountain sides.

These special lectures—they are known as "special" because not strictly technical—are always illustrated by stereopticon and biograph, and members often bring some of the younger motorists to study what can be done on a car. The current year's Gordon Bennett race is a very favorable wind-up to an illustrated lecture afternoon, after which invariably follow music, tea, and cakes.

Then the motor-car shows have to be visited, and the club is fortunate in being accorded "Ladies' Day" by the promoters of both of London's annual shows. Here the members, accompanied not infrequently by their male friends, spend considerable time studying new models, and criticising or admiring the improvements that have been made in old. These show days are always made the excuse for an informal reception, and to be welcomed to afternoon tea in the cool rooms set aside for the club is a pleasure coveted by not a few.

Some ten thousand people were at fashionable Ranelagh this year to watch this young club's first gymkhana. For two days before the first of July and all that morning the rain came down unmercifully and hopes were correspondingly low, but about noon the sun came out and a most glorious afternoon welcomed the members as they motored by twos and threes to the beautiful grounds of the Ranelagh Club.

There were only five events—a bending, a crawling, and a bomb race, and two competitors for appearance—yet these were just enough, for the spectators were sent away hungry for more, "Is it finished already?" being the disappointed query of most. The prizes excited envy and admiration, some ninety pounds' worth of silver cups, candlesticks, and cake baskets being awarded to the ten successful competitors by Lady Cecil Scott Montagu, the founder and first vice-president of the club.

Besides lectures and gymkhanas and shows, the members meet very often during the summer months at different country places. Almost every week one of the members invites the club to motor to her home for that great English institution, afternoon tea! In this way many pleasant excursions are taken to villages and towns round about London.



THE DUCHESS OF SUTHERLAND (AT WHEEL), PRESIDENT OF THE LADIES' AUTOMOBILE CLUB OF GREAT BRITAIN AND IRELAND, WITH MRS. FRASER TYLER AT HER SIDE

The club has for president, the Duchess of Sutherland, and for vice-presidents, Lady Cecil Scott Montagu, Lady Beatrice Rawson, Lady Edward Spencer Churchill, and Mrs. Gerard Leigh. It now numbers 360 members, who delight in their club and are proud to bring their friends, whose names are legion as is seen by a glance at the Members' and Visitors' Books which show that over six thousand people, within the past eighteen months, have entered the hospitable doors of the Ladies' Automobile Club of Great Britain and Ireland.

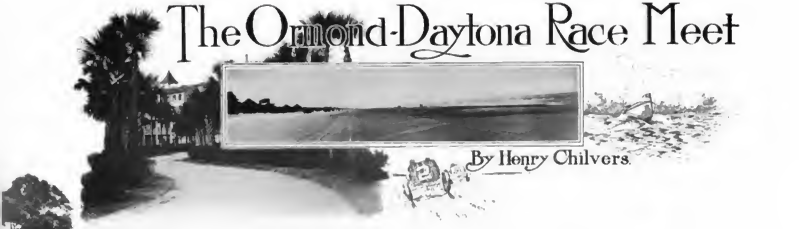
The motoring club with its membership consists exclusively of ladies who drive their own cars, is an excellent object lesson for the feminine motorists of this side of "the pond." While the number of ladies who drive their own motor-cars in the United States is very probably larger than abroad, we have yet to see a "ladies' automobile club" of any such magnitude or importance in motordom as to compare with the Ladies' Automobile Club of Great Britain and Ireland. A club of this sort would do much toward inspiring manufacturers to design a motor-car that, perhaps, would be particularly adapted to madame.



THE PRINCE OF WALES, HEIR OF THE BRITISH CROWN, IN HIS MOTOR-CAR AN ENGLISH DAIMLER

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The Ormond-Daytona Race Meet



By Henry Chilvers

LONG will Ormond-Daytona be remembered when the motor-car as a racing machine shall have passed, and when it as a pleasure or a business vehicle shall have attained that matter-of-fact position in the world that until very recently the horse monopolized. This level of beach along the east coast of Florida is far ahead of any other speed course that the world has to show, for there the conditions are ideal.

The beach itself, or that portion of it used during the motor-car races, extends from above Ormond to Matanzas Inlet, twenty miles in length, the course passing Seabreeze and Daytona, where the clubhouse of the Florida East Coast Automobile Association is located on the beach. At low tide there is 300 or more feet of good driving surface, and it is so hard that a four-ton solid tire motor-bus would leave no rut or mark on it, other than a faint streak. The racing is always scheduled to begin when the tide is half out and care is taken to select dates so as to have the racing at suitable hours.

About five years ago the motor-car made its appearance upon this beach. S. T. Davis, a member of the Automobile Club of America, drove one of the early makes of steam motor-cars over the sands. Following him the Haynes-Apperson Company sent some of their cars to Ormond. About four years prior to this W. J. Morgan, the promoter of the Ormond-Daytona meet, endeavored to have a bicycle meet run over this speedway, but proper support was not accorded, probably due to the skepticism of the possible entrants as to the practicability of racing over the sand.

The winter of 1902-'03 saw the first motor-car races on the now famous Ormond-Daytona Beach. It is true there were only two racing cars at the meet that winter, but the addition of a few touring cars made a fair race meet of it, and demonstrated beyond a doubt that this course for motoring was supreme.

The 1903-'04 tournament saw W. K. Vanderbilt, Jr., win the crown as speed king, when he did his mile in the then phenomenal time of 39 seconds flat in a 90 h.-p. Mercedes. Such phenomenal speed had never before been known. The motor-car, which up to that time, in the minds of speed lovers, had been rather a dream than an accomplishment, jumped into prominence, and W. K. Jr., awoke one morning and found himself famous. While other drivers made surprising records, their efforts were to a large extent dimmed by comparison with the efforts of Mr. Vanderbilt.



W. K. VANDERBILT, JR., WHOSE RECORD OF A MILE IN 39 SECONDS WAS ECLIPSED LAST JANUARY AT ORMOND-DAYTONA

In the following year, January, 1905, still greater deeds of speed were accomplished. First came H. L. Bowden, in a Mercedes juggernaut (the machine was overweight, and therefore its record unofficial; it was made up of two Mercedes engines coupled) which accomplished the mile in 32 4-5 seconds. The surprising and wonderful reduction of



THE NEW SHELL ROAD BETWEEN DAYTONA AND NEW SMYRNA, 16 MILES LONG, WHICH IS AMPLE INDUCEMENT FOR WINTER MOTORISTS



THE FLYING DUTCHMAN DOING A MILE IN 31 4-5 SECONDS

the former record completely upset all calculations, as the previously established record, during the same meet, by Mac-



H. L. BOWDEN AND BASLE

Donald, in a Napier, of 34 2-5 seconds for a mile, was looked upon, not only as phenomenal, but as final. During this tournament W. K. Vanderbilt, Jr., the victor of the previous meet, became "the disappointed," inasmuch as his new car did not come up to even his former record. Louis Ross, in his steam *Tea-Kettle*, a freak of the freakiest sort, also accomplished something of speed, establishing the steam record of both mile and kilometre at 38 and 24 1-5 seconds, respectively.

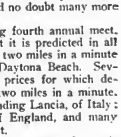
The Ormond-Daytona tornament of this year promises to be a far greater one than that of last or the year preceding that. The madness of speed seems to have permeated the blood of every man to whom the diversion of spending a small fortune is a real pleasure. Such men as W. K. Vanderbilt, Jr., H. L. Bowden, Edward R. Thomas, B. N. Shanley, Jr., W. Gould Brokaw, Alfred G. Vanderbilt, James L. Breese, William Wallace, S. B. Stevens, and others, are rather looked for as competitors, either as their own drivers, or as nearly entrants of their cars. To this number add Colonel E. H. R. Green, who, during the last summer, has taken a great deal of personal interest in motor-car racing, and George W. Young, who recently purchased the FIAT car which, in Lancia's hands, did such marvels of speed in the Vanderbilt cup race, and Harry Payne Whitney, who recently purchased the FIAT car driven by Nazzaro and which may be driven by Lancia, and no doubt many more additions to the ranks of speed lovers.

What will be done during the coming fourth annual meet, January 22 to 27, is hard to guess, but it is predicted in all quarters that the mile in 30 seconds and two miles in a minute are not impossibilities on the Ormond-Daytona Beach. Several cars are being built, the contract prices for which depend on the cars being able to do the two miles in a minute. Europe will send their best drivers, including Lancia, of Italy; Heinery, of France; Clifford Earp, of England, and many others, to do battle with our home talent.

The list of events for the coming tournament at Ormond-Daytona is as follows:

Free-for-All Championships.—No. 1, One hundred Miles International for the Minneapolis Cup (which must be won twice to obtain permanent possession). The race will be run with turns. In case the number of contestants exceeds six, the cars will be started one minute apart, and the winner will be determined by time instead of by position. In this case a standing start will be made. No. 2, One Mile International for the Sir Thomas R. Dewar Trophy. Not more than four cars will be started in each heat; a second round of heats will be run if necessary. The winner of each heat (or second round of heats, as the case may be) and the fastest second car will compete in the final. No. 3, Two-miles-a-Minute Trophy Race. The winner must equal or exceed 120 miles an hour. To be run in form of time trials. No. 4, Five Miles Open Championship. No. 5, Ten Miles Open Championship. No. 6, Fifteen Miles Open Championship.

(Continued on page 112)



ARTHUR MACDONALD

Motor-Car Records on Track and Road

Compiled by A. G. Batchelder, Secretary American Automobile Association

TRACK RECORDS

HEAVYWEIGHT (1,432 to 2,204 pounds) Gasoline Cars

Miles	Time	Driver	M.P.	Machine	Meet	Date
1	0:53	Oldfield	60	Peerless	Los Angeles	12-21-04
2	1:46 2-5	Oldfield	60	Peerless	Los Angeles	12-21-04
3	2:39 4-5	Oldfield	60	Peerless	Los Angeles	12-21-04
4	3:33	Oldfield	60	Peerless	Los Angeles	12-21-04
5	4:41	Chevrolet	90	FIAT	Empire City	6-26-05
6	5:22 2-5	Oldfield	60	Peerless	Los Angeles	12-21-04
7	6:15 4-5	Oldfield	60	Peerless	Los Angeles	12-21-04
8	7:09 1-5	Oldfield	60	Peerless	Los Angeles	12-21-04
9	8:04	Oldfield	60	Peerless	Los Angeles	12-21-04
10	9:12 2-5	Oldfield	60	Peerless	New York	10-29-04
15	14:03 3-5	Oldfield	60	Peerless	Fresno	12-13-04
20	18:45 2-5	Oldfield	60	Peerless	Denver	7-5-04
25	23:38 3-5	Oldfield	60	Peerless	Fresno	12-13-04
30	28:38 2-5	Oldfield	60	Peerless	Fresno	12-13-04
35	33:35 4-5	Oldfield	60	Peerless	Fresno	12-13-04
40	38:31 4-5	Oldfield	60	Peerless	Fresno	12-13-04
45	43:30 1-5	Oldfield	60	Peerless	Fresno	12-13-04
50	48:40 1-5	Oldfield	60	Peerless	Fresno	12-13-04
60	1:08:12 2-5	Clemens-Merz	30	National	Indianapolis	11- 4-05
70	1:19:33 2-5	Clemens	30	National	Indianapolis	11- 4-05
80	1:30:46 1-5	Clemens	30	National	Indianapolis	11- 4-05
90	1:42:14	Clemens	30	National	Indianapolis	11- 4-05
100	1:53:21 4-5	Clemens	30	National	Indianapolis	11- 4-05
200	4:03:56	Vaughan	40	Decauville	Empire City	6-24-05
300	6:04:32	Vaughan	40	Decauville	Empire City	6-24-05
400	8:20:09	Vaughan	40	Decauville	Empire City	6-24-05
500	10:24:42	Vaughan	40	Decauville	Empire City	6-24-05
600	12:49:07	Vaughan	40	Decauville	Empire City	6-24-05
700	15:10:29 3-5	Clemens-Merz	30	National	Indianapolis	11-17-05
800	17:17:26 1-5	Clemens-Merz	30	National	Indianapolis	11-17-05
900	19:44:46 1-5	Clemens-Merz	30	National	Indianapolis	11-17-05
1000	21:58:00 4-5	Clemens-Merz	30	National	Indianapolis	11-17-05
1094 8-16	24 hours	Clemens-Merz	30	National	Indianapolis	11-17-05

MIDDLEWEIGHT (881 to 1,432 Pounds) Gasoline Cars

Miles	Time	Driver	M.P.	Machine	Meet	Date
1	0:58 4-5	Wurgis	32	Reo	Syracuse	9-13-05
2	2:02	Fisher	30	Premier	Chicago	10- 1-04
3	3:02	Tracy	30	Renault	Empire City	9-24-04
4	4:01 3-5	Tracy	30	Renault	Empire City	9-24-04
5	5:00	Vaughan	40	Decauville	Syracuse	9-18-05
10	10:01 2-5	Tracy	30	Renault	Empire City	9-29-4

LIGHTWEIGHT (551 to 881 pounds) Gasoline Cars

Miles	Time	Driver	M.P.	Machine	Meet	Date
1	*0:55	Kulick	20	Ford	Empire City	11- 8-04
2	1:54	Kulick	20	Ford	Empire City	11- 8-04
3	2:51	Kulick	20	Ford	Empire City	11- 8-04
4	3:48 2-5	Kulick	20	Ford	Empire City	10-29-04
5	4:43 3-5	Kulick	20	Ford	Empire City	10-29-04

* Intermediate mile

STEAM—(All Weights)

Miles	Time	Driver	M.P.	Machine	Power	Date
1	*0:37 4-5	Ross	20	Stanley	Providence	9-10-04
2	2:05 3-5	Ross	20	Stanley	Providence	9-10-04
3	3:05 3-5	Ross	20	Stanley	Providence	9-10-04
4	4:05 4-5	Ross	20	Stanley	Providence	9-10-04
5	4:58	Webb Jay	20	White	Empire City	6-25-05
10	10:22 1-5	Webb Jay	20	White	Harlem Track	5-27-05

* Intermediate mile of another race

MORRIS PARK SPECIAL TRACK—ARC OF CIRCLE

(Track 1.39 Miles per Lap)

Miles	Time	Driver	M.P.	Machine	Power	Date
1	:48 4-5	Webb Jay	20	White	Steam	7- 4-05
1	:52 1-5	Chevrolet	90	FIAT	Gasoline	6-10-05
	:52 1-5	Christie	120	Christie	Gasoline	7- 3-05

STRAIGHTAWAY RECORDS

Free for all—Gasoline

Distance	Time	Driver	M.P.	Machine	Meet	Date
1 mile	:21 4-5	Bowden	120	Darracq	Ostend, France	11-14-04
1 kilo	*0:13 2-5	Barzo	90	Mercedes	Ormond, Fla.	1-31-05
1	0:34 2-5	MacDonald	90	Napier	Ormond, Fla.	1-24-05
5	2:13	MacDonald	90	Napier	Ormond, Fla.	1-24-05
10	6:15	MacDonald	90	Napier	Ormond, Fla.	1-31-05
20	13:24	Thomas	90	Mercedes	Ormand, Fla.	1-31-05
30	20:37	Thomas	90	Mercedes	Ormond, Fla.	1-31-05
40	31:54 2-5	Barlozi	90	FIAT	Ormond, Fla.	1-31-05
50	38:51	Fletcher	80	De Dietrich	Ormond, Fla.	1-31-05
100	1:18 2-4	Fletcher	80	De Dietrich	Ormond, Fla.	1-30-05

* This record was made by a car which is over the weight limit

Free for all—Steam

Distance	Time	Driver	M.P.	Machine	Meet	Date
1 mile	0:24 1-5	Ross	20	Stanley	Ormond, Fla.	1-26-05
1 mile	0:38	Ross	20	Stanley	Ormond, Fla.	1-25-05



THE NAPIER FLIER DOING ITS OFFICIAL RECORD, MILE IN 34 2-5 SECONDS

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The London Show.

LONDON really had two 1906 shows at one time just as New York proposes to have this month, although the big show promoted by the Society of Motor Manufacturers and Traders at West Kensington, in the Olympia, rather overshadowed the old original Stanley show held simultaneously in Agricultural Hall. Not satisfied with this, London is to have another show this month, the National show, in the Crystal Palace. While it is true that Olympia can never compare with the Grand Palais de l'Industrie in the Champs Elysees, it must be borne in mind that outside of the spectacular and architectural effect, it is the show itself, rather than the building, that should attract attention.

The London show was not an insular one, but broadly international, for not only were there some American exhibits, but nearly all the continental makers of Europe exhibited there, so that the London show scarcely ranked second in importance to the Paris show, which it antedated by a month. England, like this country, has always been a great market for the great continental makers; hence there was good and valid reason that English recruits, and was backed up by two of the French makers. The strong points of this practice are its low cost of machining and loss of extra foundry and waste costs. The practice of casting cylinders singly, no matter how many might be combined together, has not apparently grown, but in four-cylinder practice there were signs towards the idea of casting them in pairs and setting all the valve chambers on one side.

Regarding water cooling it might be said that the show developed that the thermo-syphon system is gaining, and that pipes of larger diameter giving additional water space were used. For extra cooling nearly all the flywheels had vane arms cast to create a draft.

As regards carbureters the tendency appeared to be using independent, suction-actuated, automatic valves, but so arranged with regard to the throttle as to allow entrance of full charges of clear air to the cylinders whenever the throttle is wholly closed. Looking at this practice it must be said in its favor that it is good as regards cleansing, cooling and motor braking, although there is a possibility while doing this of upsetting



THE OLYMPIA SHOW

these makers should forget their patriotism, remember their pockets, and exhibit their products in advance of the Paris show. Evidently the foreign maker has at last come to the realization of the need of a mechanical and mercantile combination at a show that had 170,000 visitors.

The show embraced over 300 exhibitors, of whom over 100 showed complete cars, and of these 51 were foreign exhibitors, although many of the British firms showed foreign cars. After all the mechanical details of the show are more interesting than any other feature, and although no very startling departures were evident, still they were so manifold in detail and in their tendencies, that they were noticeable and interesting to us because of the coming of good English cars here this year.

Multiple cylinders above the conventional four were noticeably prominent. Napier showed a six-cylinder car; Panhard-Levassor, a new six-cylinder car; Clement-Bayard, a six-cylinder car; Vauxhall, six-cylinders; Ariel, six cylinders; while a Roll-Royce had six cylinders, and one of the same make was a most original eight-cylinder motor. The practice of casting the four cylinders of a four-cylinder motor solid gained a few more the proper degree of the mixture while dethrottling the motor.

A few cars had a deceleration pedal fitted on the dash for better control in close traffic use and a few others had the regulation of the induction valve in place of the throttle. High tension magneto ignition was largely in favor, but the low tension magneto has apparently not gained anything, the probability being that it has lost some of its popularity. The well-known Mercedes type of gate quadrant for speed changing was largely in vogue and on a number of cars it was so arranged that it was impossible for an operator to shift the reverse without desiring to do so.

Some cars showed a reversing mechanism coupled up to a ratchet and pawl sprag, so that when the striking lever was moved to a reverse position the pawl was dropped downward, and was not replaced on the ratchet wheel until the reverse was again disengaged. The use of pressed steel frames was almost universal, but the secondary or underframe was very little in evidence. Metal aprons covering the crank chamber and gear box were plentiful, and in some cases the frame flanges of the frames were flared to form these aprons and to

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make bed plate carriers for motor and gear box. The good feature of using annular ball bearings all over the car seemed to be largely on the increase. In a few instances they were fitted to the crank shaft, but most of the constructors seemed shy of this desideratum, using them largely on gear shafts, propeller shafts and wheel axles only.

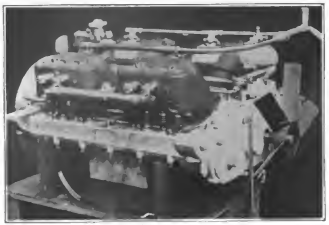
Among the special historic exhibits was the Arrol-Johnston Tourist Trophy winner and the Rolls-Royce which took second place in that event, and Lancia's internationally famous 120 m.p. FIAT racer, besides the big Daimler built for H. M. the King. Of really British cars there was a superb gathering at the Olympia, and it would be difficult for any one country to-day to claim superiority over them, ranging as they did from the 60 m.p. six-cylinder Napier to the little Adams-Hewitt car, to say nothing of the motor business wagons, which included such well-known types as the Wolseley, Thornycroft, Clarkson, Straker-Squire, Simms, Arrol-Johnston, Maudslay, and Dennis omnibuses, and a host of steam lorries. From the continent came a most glorious showing in cars from France, Germany, Italy, Belgium, and Switzerland, both for pleasure and business uses, embracing as they do the big 70 m.p. Mercedes, the 50 m.p. six-cylinder Panhard, the new 50 m.p. De Dietrich, and others of that class and the popular little 6 m.p. De Dion.



8 CYLINDER LEGALLIMIT CAR. 20 MILES PER HOUR AT ALL TIMES

One of the finest displays of luxurious motor-cars was the White steam cars. Other American cars included the Oldsmobile and Cadillacs, a striking looking car being a Cadillac brougham, which is unknown in this country; the Winton K was also there in all its glory, besides a full line of Maxwells.

That 1906 will be a year for closed cars was evident all over the show, the most notable fact of the development being that they consist largely of cars of moderate power, the most striking models being a 12-15 De Dietrich, a 14-22 Germain, and a 14 m.p. C. G. V. Lights cars, which have always been the feature of the British makers, although largely improved in detail, were shown practically in all their original elementary features. Aside from the White steam cars were some other models of English and foreign steam makes, the Miesse, and a new Serpollet. On the latter, the engine is now beneath the bonnet in front, coupled up by a long propeller shaft to a live rear axle. A small, steam tank pump, separate from the engine, feeds the fuel and water pumps—quite a departure from the original Serpollet cars, France's representative steam car.



8 CYLINDER ROLLS-ROYCE MOTOR

In the tire section outside of some small detailed improvements there was nothing new, all the famous tires of the world being largely in evidence, however.

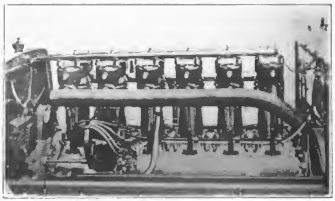
English carriage body makers were always famous, long before the introduction of the motor-car, but the show revealed a most wonderful display of the highest grade of work that body builders have ever produced. As has been mentioned before, the show was a revelation in closed cars, for on nearly every stand were Limousine or Landaulete bodies.

Luxury of fitting has evidently reached its limit with ivory trimmings, silk upholstery and ingenious ideas for comfort. On the front seats of the majority of the cars the ungraceful and equally uncomfortable bucket seat has gone the way of the rear entrance tonneau never to return. Naturally all of this has emphasized the tendency to lengthen the wheel base, the minimum being 7 feet 6 inches long, on the smallest car in the show.

The Briton has evidently awoke to the fact that it usually rains in that benighted climate of theirs and so Cape cart tops were numerous.

The largest motor in the show was a four-cylinder 100 m.p. Siddeley, which attracted almost as much attention as Hemmery's racing Darracq, and the new Delaunay Belleville.

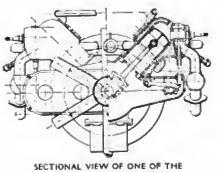
Nearly all the cars had the rear springs mounted outside of the frame, and in some cases they were coupled to a transverse cross spring. An extreme novelty was the C spring on the C. G. V. 14 m.p. Landaulete, novel only because new in motor construction, having long been the graceful thing in horse-drawn coaches. In the Clement car the front part of the upper part of the back spring was dispensed with, the remaining back part of the spring being attached to the angle of the frame instead of the dumb irons as heretofore. The practice of dropping the frame to a point in front of the rear axles so as to keep the weight and center of gravity near the ground seems to be a growing one. The practice may be all right for good English roads, but not for our roads with their big ruts.



NEW 6 CYLINDER 50 M. P. PANHARD MOTOR

Frames were made very narrow in front, so as to allow greater turning radius, and the steering rods were almost universally placed in back of the front axle, where they were out of harm's way. The shaft drive to the live axle was more popular than last year, especially on large cars, so that it may be said that chain-driven cars were in the minority.

(*Continued on page 132.*)



SECTIONAL VIEW OF ONE OF THE ROLLS-ROYCE 8 CYLINDERS



NEW 60 80 M. P. 6 CYLINDER NAPIER CHASSIS

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Correct Motor Raiment

By Joel Feder

Charming Designs in Furs and Furry Effects—Headwear Bewitchingly Becoming—Coats That Are Both Rain and Wind Proof—Less Spectacular Furs in Use—The Staple Pelts Considered a Better Choice—Cleverness in Small Accessories—Muffs That Reach to the Elbow—Smart Little Turbans Include a Curtain Hood

THE automobile shows, in these latter days, are not considered complete in each and every respect unless there is at least one section, and a goodly-sized one at that, devoted to the very latest things in auto apparel.

The various great automobile headquarters in Paris—each manufacturer maintains a huge showroom in which every possible accessory and equipment for the machine is on permanent display—have each their charming corner devoted to fashion in the very latest things for automobile toggery; and it is quite a favorite thing to drop in at the Palais Mercedes, or the Palais Panhard, mornings or afternoons, to become acquainted with the very latest caprice of fashionable folks in this line.

The furrier, perhaps, more than any other has reason to bless the automobile craze; for furs and furry garments assuredly do lead the styles in this direction.

In the later showings the observant woman who has an eye for fashion realizes that there are far fewer of what one might call the spectacular furs in use. The leopard skin coats, the huge shaggy bearskin garments that made their wearers look as though they belonged in a menagerie rather than in an auto, the long-haired monkey skin which to many has a creepy suggestion of human hair, all of those freakish affairs Dame Fashion has wisely enough relegated to the background and her devotees will have none of them.



From Saks & Company
MOTORING COAT OF BEAVER FUR

It is the staple pelts that are considered the better choice; and by that term the furrier explains that he includes all of those that are modish for street and carriage wear, and are not at all inappropriate for such uses. Sealskin is once more in favor after a period of neglect; and charming indeed are the uses that this well-tried and time-worn skin is put to. Coats of this close rich felt are invariably finished with collar and more durable cuffs of some long long-haired fur.

As might be expected, it is the long and comfortably loose type of coat that is most in favor. There is a delightful air of luxury to those novel productions that must surely appeal to the woman with a sense of the charm of dress. Everything that can possibly be invented to add to the daintiness and chic of the appearance is on display at the shops where such toggery is sold, and there is no longer the slightest reason for a woman to make a fright of herself, to swathe her head in absurd and unbecoming veils, to take to yachting caps, and other mannish headgear which never was the least bit piquant or fetching; for all of the latest things are distinctly feminine, bewitchingly feminine in their appearance, and are just as useful and as practical as they are pretty—and that is saying a whole lot.



From Saks & Company
WIND SHIELD FOR THE EYES



From Saks & Company
CHARMING CRAVAT AND CAP COMBINED OF GREY SQUIRREL

Those who can well afford to order separate costumes for each and every purpose upon the social calendar are ordering long coats in fur, with a skirt of velveteen to match, this latter having a shaped flounce at the bottom of the fur to meet the coat. In this wise the impression of an all-fur costume is produced, but without the weight—and incidentally minus the expense—that such a costume would involve.

One such is on view in several different pelts. That exquisitely soft and glossy baby lamb is displayed in an Empire coat with a high collar that may be turned up around the face when desired. The skirt to this is in moire velveteen that accords delightfully with the moire markings of the delicate fur; and the shaped flounce—the *volant en forme*, as the French furrier calls it—is applied in vandyked points to the velvet

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From Stern Bros.

THE MODE IN CARACUL AND MOLESKIN

lamb cloth is euphoniously called. This has the curl and gloss of the fur which it so closely resembles, but with only a fraction of the weight that the natural pelt is guilty of.

For the separate coats there are all manner of pretty and dainty effects in force. Sea lion, Russian pony, otter and beaver are some of the pelts that are smiled upon; and the mode and method of their fashioning are as various as well may be. Huge capes are favored in mink, the fronts being slit—with sometimes a faint semblance of a sleeve thrust in the opening for the hand to pass through. Sealskin, too, is made up after this mode; and both types are furnished with fetching Capuchin hoods at the back that may be thrown up over the head with the most delightful effect.

The embroideries though that are in such modish consideration for furry possessions of more formal intent, are altogether out of place upon automobile garments. The plainly severe and practical is the keynote of their fashioning, and anything that does not have a practical purpose to account for its presence is barred.

But it is the fascinating headgear that the pretty woman—and her less favored sister, perhaps, if such exist—will simply rave over. There are hoods in all of the fashionable furs, hoods that are as far removed from the hoods of our childhood as well may be. The new ones come well down on the nape of the neck, and do not make the slightest effort to define the shape of the head. They are loose enough, too, not to muss the hair unduly, especially when a good coiffura net is worn. Indeed, this latter little accessory is imperative and indispensable to the fair autoist, for windblown and ragged locks are no longer considered becoming at all.

All of the latest cars are equipped with a plate glass front that may be omitted, if occasion warrants; but it is a foregone conclusion that this will be a permanent fixture upon the car that does any sort of touring duty at all. As a wind shield it is welcomed by the woman who "bubbles," since it enables her to preserve some semblance of modish headgear without enswathing herself in veils for needed protection.

And, speaking of veils, reminds one that the shaped auto veil is no longer the thing. Nowadays the smart girl simply purchases a couple of yards of double weave and double width chiffon, and ties this on over her smart toque or turban. The face is already protected by the usual mesh veil, and this is simply to keep her hat on the head, and afford some additional protection to her wavy locks from the assaults of wind and dust.

Some of the very latest cars have heating pipes in the floor, somewhat after a radiator device. Others have to rely upon little charcoal stoves, such as the Japanese use, and there are not a few that have hot water bags filled at frequent intervals along the road. Fur-lined and velvet-covered carriage boots are often in demand for auto wear, and they are both smart and comfortable.

Muffs that have frills coming up to the elbows are another recent fad, and there are all sorts of dainty devices in the way of wind shields ranged along the counters and showcases from which one takes one's choice. The use of those disfiguring goggles is altogether passé; and the up-to-date autoist seeks everything that shall enhance rather than detract from her appearance, while she enjoys the sport that attracts young and old alike.

A coquettish bit of headwear that has quite recently appeared is a combination of cap and neck scarf. The cap part has the crown pleated into a smooth band of the fur, and is arranged to some height in the front. Broad scarfs of the fur—which in this instance is squirrel—are set under the cap band at the back and sides. These are fastened at the top for a couple of inches, then arranged to cross through a slide as do the stole shaped neckscarfs. The scarfs are brought round the throat and tied through a slip knot of the fur.

This headgear is most effectively worn with a long squirrel-lined coat of dark gray broadcloth. Carried with it is one of the new bag muffs—a huge affair that shirs up at the top on a cord—quite like a gigantic shopping bag. Cuffs of the squirrel finish the sleeves of the coat, which are most necessary for comfort even when the large muff is provided.

Carriage boots of the dark gray broadcloth, lined and trimmed with the squirrel, are another item in this outfit—it being quite the proper thing to have all the details match.

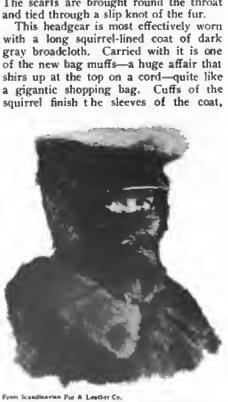


A PARISIAN CREATION IN GRIFFONETTE



From Scandinavian Fur & Leather Co.

FOR THE CHAUFFEUR



From Scandinavian Fur & Leather Co.

COMPLETE PROTECTION FROM WINDIAND WEATHER

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The Magneto.

BY ALEX SCHWALBACH.

(Continued from December)

ANOTHER well-known and well-made magneto is the Eisemann, such as is used on the Panhard, Paekard and Viqueot cars.

As shown in the diagram (Fig. 1), the Eisemann igniter consists essentially of a magneto and a transformer. The primary of the latter is constantly connected with the terminals of the former, and a short-circuit interrupter, which also is connected with the terminals, permits at will of sending the current of the magneto into the transformer.

When the interrupter is closed, the magneto is in short circuit, and its current attains its maximum degree of intensity and power. If, at this moment, the interrupter be opened, it will be possible for the current to circulate only through the primary of the transformer.

The result of this is that when the current reaches the transformer, a supermagnetization of the iron core is produced, greater than that which would correspond to the current normally developed by the magneto unprovided with this arrangement.

The rôle of the transformer (Fig. 2) is to restore to a spark, with as little waste as possible, the energy furnished to it by the primary current. The efficiency of the transformer is the ratio of the energy restored to the energy furnished.

Referring to the diagrams, in Figs. 3 and 4, of high-tension ignition apparatus, we find that both break the primary current in order to produce in the coil the variation of magnetic flux which gives rise in the secondary to the high tension that is utilized. But when a current is broken by separating the two contacts of the breaker, a spark is produced between them. An endeavor is made to prevent such spark; in the first place, because it rapidly destroys the contacts, and, in the second place, because the energy expended to produce it is lost for ignition. The wear resulting from this spark has been abolished by the use of a condenser, which stores up the energy instead of allowing it to produce its destructive effect. Unfortunately, the condenser, after having become charged, discharges itself, and the discharged current flows in the same direction as the primary current primitively broken. The suppression of the current cannot, therefore, be considered as instantaneous. This discharge current, due to the action of the condenser, is, therefore, not only useless, but injurious.

Such is not the case in the Eisemann ignition, which produces the useful spark by the emission of the primary current into the transformer when the breaker is opened. As the circuit of the magneto remains closed, it would seem as if a spark could not be produced by the current breaker. In reality, in consequence of certain secondary phenomena, a small spark would jump at the breaker, when opened, were it not "blown out" with a condenser.

But this time the discharge current of the condenser, which, as we have said, circulates in the direction of the primary current, reinforces the latter while it is being established, in increasing what may be called the electric "ram-stroke." It is, therefore, far from being injurious, and becomes, on the contrary, an auxiliary.

In some, as in the Eisemann ignition, the condenser does not give rise to a dissipation of energy. So it is in this apparatus that the efficiency of the transformer is the highest—that is to say, the power utilized in the form of spark is the greatest.

The Eisemann transformer (Fig. 5) consists of an iron core and two windings, imbedded in a special insulating material and



FIG. 1—DIAGRAM OF IGNITION BY EISEMANN MAGNETO

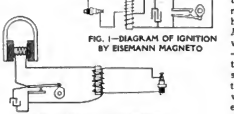


FIG 2—IGNITION BY TRANSFORMER AND BREAKAGE OF THE PRIMARY CIRCUIT



FIG. 3—IGNITION BY BREAKAGE OF THE PRIMARY CIRCUIT WITHOUT TRANSFORMER

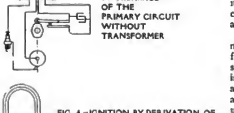


FIG. 4—IGNITION BY DERIVATION OF THE PRIMARY CURRENT

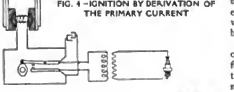
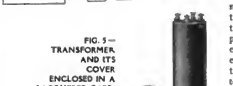


FIG. 5—TRANSFORMER AND ITS COVER ENCLOSED IN A LACQUERED CARD-BOARD BOX



FIGS. 6 AND 7—DISTRIBUTION OF THE MAGNETIC FLOW IN THE ARMATURE

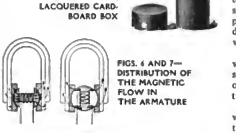


FIG. 8—ARMATURE AND MAGNETS OF EISEMANN MAGNETO



FIG. 9—CORE OF THE ARMATURE A DOUBLE T OF CAST OR SOFT IRON

placed in a lacquered cardboard box. The extremities of the two windings end at terminals fixed upon the cover of the box. Each terminal carries a letter, serving as an indication for mounting. The terminals, *B* and *B*, the extremities of the primary wire, are to be connected with screws placed upon each of the brush supports of the magneto. The terminal *M* is to be connected with the secondary wire, which begins the winding of the entrance wire—that is to say, that which is in contact with the last layers of the primary. This terminal should always be connected with the mass of the motor. The terminal *H* is to be connected with the other extremity of the secondary or exit wire—that is to say, the are that terminates the winding. This terminal should be connected with the distributer. As a general thing, it is the terminal that gives the highest tension.

In addition, for facilitating the mounting of th: apparatus, the terminals are so arranged that they may be easily recognized. Those of the primary, or low tension, are very close together, while those at which are the extremities of the secondary end are wide apart, because of the sparks of high tension that have a tendency to jump between them.

The ignition is effected by means of a magneto, which supplies the primary of the transformer, the secondary of which furnishes the spark to the plugs. The magneto comprises an inductor, formed of permanent magnets, and an armature. The latter, which is formed of a double T (Fig. 9) of cast or soft iron, carries upon its median part a winding of which the extremities are connected with two rings, upon which the current is collected by two carbon brushes.

In the position shown in Fig. 6, the spirals of the winding are traversed by the magnetic flow emanating from the magnets. In the position shown in Fig. 7, the flow is minimum. It may be seen that the flow will change direction twice per revolution. The laws of induction teach us that there will, consequently, be produced in the armature a variable periodical electromotive force presenting a maximum at every half revolution. If we close the exterior there will correspond a maximum of currents to every maximum of electromotive force. We shall, therefore, be able to obtain two sparks per revolution of the magneto. This condition determines the rotary velocity of the magneto with respect to the motor.

If the motor is a four-cylinder one, such velocity will be that of the motor, since four sparks are necessary at every two revolutions of its shaft. If it is a two-cylinder one, a control, reducing the velocity one-half, may suffice.

Finally, if the motor has three cylinders, it will require three sparks at every two revolutions. It will suffice for the motor to make one revolution and a half at every two revolutions of the motor.

The current-breaker placed upon the magneto and controlled by a cam causes an abrupt emission of the current of the magneto into the primary of the transformer. This impulsion of current gives rise to a high-tension current in the secondary, and this is automatically sent to each of the spark plugs by a distributer connected mechanically with the magneto in order to operate synchronously with it.

Finally, a special arrangement permits of modifying the lead of the spark in the motor.

We shall now examine in succession the inductor, the armature, the mechanism of the current-breaker, the distributer of the high-tension current, and the mechanism for regulating the spark.

The inductor is formed of three pairs of

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horseshoe magnets, placed side by side. These magnets are secured by screws to cast-iron polar pieces, the object of which is to distribute the magnetic flow uniformly upon the armature. (Fig. 8.) The nature of the steel and the temper to which the magnet is submitted after manufacture are the sole guarantees of the duration of the magnets. They assure them a greater resistance to the external causes that may bring about their demagnetization, such as heat, vibration, shocks and the very near vicinity of powerful electromagnets or alternators.

The armature, which comprises a soft-iron core (Fig. 9) and the winding in which is engendered the primary current, is set at its two extremities into bronze disks, which are carried at their center by two steel shafts, which constitute the axis of revolution of the armature. One of the extremities of one of the shafts carries the gear that controls the distributer of the high-tension current, and receives its rotary motion from the spark-regulating mechanism which connects it with the motor. The other part of the shaft allows of the passage in its centre of the extremities of the armature wire, which thus communicate with two insulated copper rings upon this shaft (Fig. 10). The current is collected upon these rings by two carbon brushes. Finally, at the very end of the shaft is situated the cam that actuates the breaker.

The oiling of the armature bearings is assured by two lubricators, which at the same time do service for the magneto journals.

The mechanism of the circuit-breaker consists of two members, capable of coming into contact through two platinized pieces, and of putting the brushes of the magneto in short circuit. The lower piece, which is stationary, is connected directly with the brush nearest to the armature. The upper piece, which is secured to a jointed device, is brought into contact with the other brush by a "safety brass."

This movable piece, which is called a "lifting hammer," carries at its extremity a roller designed to receive the action of the lifting cam. It will be understood that every time the cam, on lifting the hammer, breaks the contact, the current produced by the magneto will be obliged to traverse the transformer. On the contrary, when the hammer falls back upon its seat, the current will traverse the short circuit, and the transformer will become inert.

The high-tension distributer is placed above the armature, in front of the magnets, from which it is separated by a thick piece of insulating fibre fixed with nuts (Fig. 11). The distributer, properly so called, is formed of a disk of fibre which carries at its periphery a segment or metallic contact, connected with the secondary of the transformer, and behind the disk are fixed tappets, each connected with a spark plug. When one of these, through the revolution of the distributer, comes in contact with the segment, the high-tension current goes through it to the corresponding plug and produces a spark therein.

The distributer is carried by a shaft, which is controlled by the magneto armature through two toothed wheels, which reduce the rotary velocity to the proper degree.

The keying of the distributer on its shaft, and the length of the contact segment, are so calculated that the tappet and segment shall be already in contact at the moment at which the magneto, by the play of the breaker, sends its current into the transformer, and, further, that this contact shall take place when the breaker of the magneto, in closing, stops the passage of the current into the transformer. In this way it is certain that no current passes from the segment to the tappet, either at the moment at which they enter into contact or at the moment at which the segment leaves the tappet, and, consequently, no spark capable of injuring them will be produced.

The mechanism of the spark advance (Fig. 13) connects the armature of the magneto with the spur wheel, controlled by the motor in such a way that it is possible to cause the armature to revolve by a certain angle with respect to the wheel that actuates it. The angular displacement of the armature at the same time causes the arm of the circuit-breaker to turn. If the displacement occurs in the direction of revolution of the armature, the cam will lift the hammer of the breaker sooner. The result, therefore, would be an advance of the spark. A contrary displacement will produce a retard.



FIG. 10—SHAFT OF THE ARMATURE WITH SPARK REGULATING ARRANGEMENT



FIG. 11 - DISTRIBUTION OF THE HIGH TENSION CURRENT IN A MAGNETO FOR 4 CYLINDERS; AND SECTION OF THE DISTRIBUTER.



FIG. 12 IGNITION BY DYNAMO AND CURRENT BREAKER

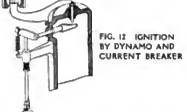


FIG. 13 - MECHANISM OF THE SPARK REGULATOR

In order to obtain as fine a spark as possible, the breaker must operate precisely at the moment at which the current is maximum. This will always take place since the armature and the breaker cam are on the same shaft.

Finally, since the distributer of the high-tension current is controlled directly by the armature through a gearing, we are certain that it will always be ready to send the current to the desired cylinder by the breaker.

The variable movement of the armature with respect to the wheel which controls the magneto, therefore, assures the variation in the lead of the spark.

The mechanical arrangement that permits of this variable movement is as follows: The toothed wheel is not secured directly to the shaft, but to a socket that embraces it. The shaft of the armature is hollow, and in the interior moves a piston which carries a lug. This lug traverses an aperture in the annular wall of the armature shaft and engages with a groove formed in the interior of the socket that carries the controlling wheel of the magneto. The lug, therefore, transmits to the armature the rotatory stress of the socket.

When the piston is moved up or down in the hollow shaft, the lug that it carries is displaced both in the groove of the socket and through the aperture in the shaft. Now, while the groove is formed in the socket parallel with its axis of rotation, the aperture in the side of the shaft is in the form of a spiral and extends around it by more than a sixth of a revolution. The result is that the shaft of the magneto is capable of turning by the same angle with respect to the toothed wheel that actuates it. The driver acts upon the piston rod by means of a flexible cable, through the intermedium of a ball and socket joint.

(*To be continued in February* Motor)

Fig. 14—Diagram of Wiring

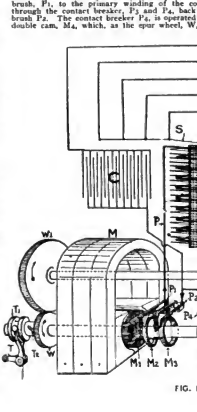


FIG. 14

M let the field magnet of the magneto, the armature of which, M_1, is mounted on a shaft connected by the spur wheels, W and W_1, with a separate shaft parallel to it, and driven at half speed, the same speed as that of the cam shaft of the engine, and carrying on its far end the high tension commutator D. The spur wheel, W, is not rigid with the armature shaft, but is integral with a sleeve carrying the pulley, T_1, the sleeve driving the armature shaft by means of a pin, T_2, a fork, T_3, connected with a bell crank lever, controlling the movements of the sleeve. The ends of the armature winding are connected to the two connecting rings, M_2 and M_3, with which the spring connecting brushes, P_1 and P_2, make contact. The current passes through the conductor, P, from the brush, P_2, to the primary winding of the coil, and through the contact breaker, P_3 and P_4, back to the brush P_2. The contact breaker P_4, is operated by the double cam, M_4, which, as the spur wheel, W, is designed to run at twice the speed of W_1, breaks contact four times for every revolution of the armature and of the engine. A condenser C, is arranged to cross the contact breaker. The condenser is shown connected to P_3 and P_4 by thin lines, but in practice it is of importance that the wire to the condenser should be at least as thick as the primary winding of the induction coil. One end of the secondery coil, S, is ground, and the other is connected to S_1, the brush of the revolving high tension commutator or distributer F. The current furnished by the armature, M_1, is alternating, but the cam, M_4, is so arranged that the circuit is only broken when the current furnished by the armature is at its maximum in either direction. The high tension commutator or distributer, D, receives current through the brush, S_1, which runs on a metal ring, forming the periphery of the wheel. This in conducting connection with the segment, D_1, which makes consecutive contact with each of the brushes, D_2, leading to the sparking plugs, F_1, F_2, F_3, and F_4.

The moment of sparking is determined by the breaking of the contact, P_3, P_4, the contact to any one of the brushes, D_2, having been made by the segment, D_1, slightly before that instant arrives, the connection being also maintained slightly after the spark has passed. This enables the spark to be advanced or retarded within the necessary limit by simply advancing or retarding the moment at which the contact breaker, P_4, is raised. The timing is effected by the fork, T, engaging with the guide pulley, T_1; moving this to the right or left rocks the shaft carrying the cam, M_4, and the armature relatively to the spur wheel, W, and by moving it to the right or left, the moment of ignition may be varied as required.

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The Paris Show.

PARIS, the hub of the universe of motordom, has just had its annual motor function at the Grand Palais, officially known as the Eighth Annual Salon de le Automobile. The show was opened on December 8th and closed on Christmas Day, having attracted over half a million visitors. The price of admission was only one franc, but on every Wednesday the price was five francs. The exhibition closed every night at seven o'clock, being open all day Sunday.

The motor-boat show was in a separate building, close by on the banks of the Seine, visitors to the Grand Palais being presented with a separate ticket to the exhibit in the Serres de la Ville. Otherwise the admission charge to the boat section was one franc. A line of motor-omnibuses brought visitors from all parts of Paris to the Salon, just a moving hint of the future method of urban conveyance. The motor-omnibuses run during the entire exhibition, making the following trip, beginning at The Bourse, Rue Vivienne, the Grand Boulevard, Place de l'Opera, Boulevard de le Madeline, Rue Royale, Place de la Arcade, the Champs Elysees, Avenue Nicolas II and the Cours-la-Reine. The stop was made at all the stations that existed upon the route and an exchange of correspondence was made as with ordinary vehicles. A special station was organized before the club house of the Automobile Club of France. The Grand Palais, as well as Serres de la Ville, the Green Houses of Paris, were reached by the omnibus at both extremities.

The names of the motor-car makers who provided the vehicles for this first motor-bus line opened to the Parisian public were Eugene Brillie, Delakaye, De Dion, Krieger, Mors, Peugeot, Serpollet and N. A. G. Societé des Automobiles.

Venetian masts, carrying wing ornaments, lined the approaches on the Avenue Alexandre III and along the Champs Elysees. The masts were connected with festoons of orange-colored lamps, the prevailing color scheme of the decoration. Heroic reproductions of the Automobile Club of France's monogram were abundant and illuminated with electric light, besides a colossal lighthouse on the island refuge at the very entrance to the Avenue Alexandre III.

Here staff decorations representing ships' prows were on a sloping mound over 100 feet wide, the mound itself being covered with sods. Gorgeous terraces of flower beds, shrubs in bloom surrounded the central monument, and other ornamental beds were completely covered with hardy shrubs and decorative plants. The *coup d'œil* of the show was superb, but, of course, this was aided in every respect by the magnificent structure in which it was held. Previous shows held in the Grand Palais have been well described as beautiful! splendid! magnificent! but these words fail to adequately describe the gorgeousness and luxuriousness of this last decorative scheme.

The roof of the Grand Palais, a noble span of glass and iron, was left wholly undraped and undecorated, so that during the day no artificial light was needed, but when twinkling twilight came, and lighting up was in order, the great sunburst in the center of the roof internally illuminated, and externally ribbed with glowing lines of orange-colored lamps, with the center of white lamps, formed the radiating point of the whole illumination scheme. Lattice work was carried down from the very top of the dome on the main arches, and elaborate floral designs shone out in electric lights.

All the other structural features of the Palais were outlined by lamps, the great dome itself being looped with cables of lamps and designs of stars, the smallest of which contained thirteen lamps and the largest over fifty lamps. Over a quarter of a million electric lamps were used, and tons of glass in the let, guided by M. Gustave Rives and the members of the Council of Administration of the Automobile Club of France, formally opened this, the eighth Salon of the Automobile.

Motor-car shows are, of course, held for two reasons, matters mechanical and matters mercantile. The predominating feature of the Paris show was the number of good and well-built cars, not all of which are well known here. There are, of course, numerous agencies for great French cars in New York, but there are still many more to come.

An international reputation in motor-car construction is a matter of time; hence we must not assume that every good French car has already been seen in this country. Many of them are not shown or sold in America, because while the quality of the output is high the quantity of the output is small. But it was in this very class of motor-cars there were to be found features which show that the industry has not become standardized and a finality in construction reached.

Nearly all the cars in the Salon used pressed frames, so that the pressed-steel frame is now a *sine qua non*. Ball bearings which were formerly limited to axles and gear boxes have now invaded the motor itself. Such conventional things as the Mercedes idea of the double-shaft change speed gear, with its gate control, was seen on every hand. Clumsy-looking dumb irons have been abandoned for what the French call demi-pinectles, or semi-elliptical rear springs, the C spring on the C. G. V. being a novelty.



THE SHOW BY DAY



THE SHOW AT NIGHT

It needed no expert census taker to ascertain at a glance that the four-cylinder motor still led. Panhard did not even exhibit the six-cylinder motor which they say they have built for English and American trade only. The British Napier six-cylinder was shown, also the French Cattereau. Buchet, the famous maker of light motors, showed an eight-cylinder marine motor. The action for ejection or dispossess begun by the shaft drive against the chain drive secured a notable convert, in part at least, in the Richard-Brasier, but on the other hand, it must be borne in mind that there are cases where the victory was won by the other side.

The battle of the ignition systems was the most interesting in the show. The conventional accumulator system as a single unit is a thing of the past, the French makers preferring to use it in connection with the high tension magneto, sometimes using a low tension magneto.

The show revealed that the coming of the magneto has caused in be now constructed in

(*Continued on page 166*)

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SOCIETY FOLK WHO MOTOR

By Priscilla

Speedwell

"DO you know that land where the orange-blossoms bloom?" This is the love-sick, plaintive query in "Mignon." This same query is now uppermost in the minds of all the motorists. Each asks the other whether bound for Ormond-Daytona, or Palm Beach. But neither sentiment nor the scent of the orange blossoms attracts them. 'Tis passion for speed and the odor of the motor-car. So off for the races in the South, away from snow-encumbered roads!

• • •

MR. and Mrs. Alfred G. Vanderbilt, as well as Mr. and Mrs. William K. Vanderbilt, Jr., will be competitors and spectators in Florida when the great races are run. And Mrs. E. R. Thomas, the lovely blonde beauty, will be there to see the fun, even though she prefers that her tall, sport-loving husband should not compete in any way to curtail his length of life and length of limb.



MRS. E. R. THOMAS AT LEFT WITH MRS. WILLIAM JAY ENTERING HER C. G. V. GASOLINE CAB

MR. CHARLES G. GATES, scattering yellowbacks with the nonchalance of Scotty, is motoring over many miles each week. With his pretty wife, at every hostelry he is a welcome guest. The arrival of his Mercedes means a rush to the door to give him salaams and smiles. One of his favorite trips is to the Lakewood Hotel. Mr. Gates has also purchased a 60-motor-power FIAT, with open-touring body, and handsomely finished in his turf colors.

• • •

MR. and Mrs. Roy Rainey, who have been whizzing out every day in their big red car, on the roads leading from Lakewood to Freehold and Princeton, will also be at Palm Beach, where Mrs. Rainey, as one of the jolly Andrews sisters, was a great belle.

• • •

MR. GEORGE J. GOULD, who, before he was a motorist, was a great bicyclist, is using his Richard-Brasier at Lakewood now, and Mr. Arthur B. Claflin, in the car that carried him on his long tour in Europe, is another motorist who uses the sane New Jersey roads.

• • •

EVERYBODY likes John Moller, Jr. He is one of those energetic men of wealth who, like Cornelius Vanderbilt, puts on overalls with pleasure and works in a shop. Until he became interested in the mechanism of motor-cars he had never been in business. Accompanied by his wife, he made a long trip in his auto-car this fall, from the White Mountains to the Berkshires, and now is preparing for a visit to Palm Beach.

• • •

AMOS PINCHOT is the owner of one of the Panhards entered at Albany during the month. His car will probably take him to Milford, his forefathers' native town, where the country-folk take great pride in the "Pinshots," as they call them. Gifford Pinchot, the forester (pronounced "Panshow"), is a great chum of Abraham Archibald Anderson, the artist, cowboy and forester, and one of New York's first motorists.

• • •

PETER COOPER HEWITT has a mind as brilliant as the lights that bear his name. He is the Tuxedo Edison. And Ned Hewitt, his brother, even at Princeton, was noted for his inventions. While a student at Princeton his ingenious devices gave him fame, and he made his own motor-car. But Mrs. Peter Cooper Hewitt (Frank Work's daughter) has not encouraged home talent. Instead, she has bought a fine Renault and is using it a great deal on the roads that run out from Tuxedo.

• • •

MR. PAYNE WHITNEY and his poet-wife are enjoying their new De Dietrich over the Long Island roads. As Mrs. Whitney is in mourning for her father, the late John Hay, all her excitement is that of the motor and the muse. She has no part in indoor gayeties. Mr. Harry Payne Whitney and his wife, who has a talent for sculpture, have a Columbia electric—a new purchase in which they take especial delight. Mrs. Whitney is also in mourning for her uncle, Mr. Abram E. Gwynne. The motor-car is, indeed, a solace to those to whom Mme. Grundy's restrictions add burdens when bereaved.

• • •

MME. NORDICA travels everywhere in her motor-car. In it she is often "Driven back to Eden"—her country home at Ossining. As everyone knows, she is a society lady as well as an opera star, and has a box in the diamond horseshoe at the Metropolitan. She often arrives for a matinée in her motor-car. A closed vehicle she dislikes. Fearless, she seems, of chill winds and draughts — unlike the other songbirds who are stout but tender. All our opera song-birds may join the Aero Club and sometimes sing, and soar, on high with wings.



MR AUGUST BELMONT WITH A STAG-PARTY IN HIS PANHARD

FIND the yachtsman who is not an ardent motorist. He usually gets to be a "garagist." (One must have cars to fill a garage to be considered an ardent motorist—cars to burn and chauffeurs to kill.) Commodore Frederick G. Bourne, of the New York Yacht Club, loves his motors as well as his boats. His newest pet is a Clement-Bayard. And Lewis Cass Ledyard, former commodore, has added a Panhard to his possessions.

• • •

THE return of the conquering heroes to Annapolis was most dramatic and impressive. The victors of the big Army and Navy football game were given an ovation equal to that of men who have conquered with balls fired from the cannon of warships. The team proper were put into the "auto-flyer," from which waved the blue and yellow pennant; while the other football heroes also made return in horseless vehicles, for the cabs were *hauled* by enthusiastic middies.

• • •

MR. J. HOPKINS SMITH, often confounded with Mr. F. Hopkinson Smith, the engineer, author and artist, is frequently seen in his new Rochet-Schneider. The streets of New York have, in fact, become gay and Parisian-like with the colors of cars that flash back and forth—the tints are as bright and as many as in the first scene of "The Queen of Sheba."

• • •

MR. JAMES STILLMAN has a C. G. V. gasoline cab, and uses this for his bouquet of fair ladies that he always takes to the opera. His daughter-in-law, Mrs. James A. Stillman, is often his guest.



MR. AND MRS. JOHN MOLLER, JR., TOURING IN THEIR AUTO CAR

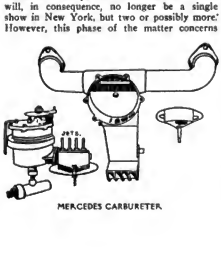
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The Resumé of the Year

By Richard Wright

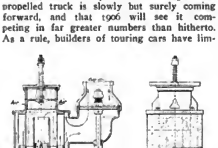
THERE are many who stand ready to acclaim 1905 as the banner year—the best by all odds that the motor-car has ever enjoyed. Undoubtedly it is all of this and more; it marks the greatest advances made in the art, the number of cars, and the low prices at which reliable cars can be purchased; but had there not been more than fifteen years of experimenting back of it, and fully five years of manufacturing on a comparatively large scale, the past year would not have been considered as anything out of the ordinary. The events that have led up to present success take one through the heart-trying times experienced by the early strugglers, and, when collated, form quite a respectable bit of history, capable of filling a good-sized volume. They naturally cannot be dwelt upon at any length here, nor, in fact, more than touched upon from time to time, but they must, of course, be borne in mind as forming the basis from which all comparisons of the progress made in the past year must be drawn.

As a starting point, the annual show must be taken, though, as a matter of fact, it marks but the culmination of the efforts of designer and builder combined that have extended over a period of six to eight months previous. Here as in almost everything else, 1905 has been productive of conditions which, in all probability, will never be duplicated in the future. Five years before it was an extremely meagre and very disheartening array of freaks—in the light of present-day advancement this is the most fitting appellation for them—that in their lonesome fewness spread thinly over the Garden floor in New York, in a vain attempt to fill what appeared to the exhibitors to be a vast barnlike structure capable of housing ten times the number of vehicles they could produce for the purpose. And it was. But four years later it became a problem where to stow them, and the hitherto neglected cellar and balconies were filled to the last square inch. The following year, 1905, showed the Garden up in a vastly different light, for, despite that the bulk of the foreign cars that had formerly been a feature, was missing, many applicants were refused space, while it was further necessary to reduce materially that of the principal exhibitors in order to accommodate all the privileged ones. The time has passed when New York, which is concededly the selling center for the trade at the opening of the season, can attempt to hold one exclusive show that is representative of the industry. Primarily, there is no single building in the metropolis large enough to house more than a fraction of the exhibits, and, further, trade affiliations have, in the past twelvemonth, taken on concrete form to an extent where shows will reflect a community of interests on the part of the exhibitors. There will, in consequence, no longer be a single show in New York, but two or possibly more. However, this phase of the matter concerns the manufacturer personally rather than otherwise, and, as it has no effect on the design or peculiarities of its product, need not be dwelt upon further here, except to point out that it is one of the things that will go down in history as having had its inception in 1905—a period when, for the first time, the manufacturers were in a position to heave a sigh of relief and give some attention to matters other than solving the problem of how to make a car that would run and could be depended upon to do so. Previous to that year there were not sufficient manufacturers in the field, and their total output was not such as to cause any great anxiety as to its marketing. It is not overdrawing the statement to say that the industry emerged from the chrysalis state into full-fledged being with the advent of the past year.



MERCEDES CARBURETER

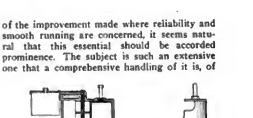
Before taking up in detail the developments of the past year, reference must be made to the general progress that has been brought about in that time. And in this connection the great strides made by the commercial vehicle must be given precedence. While the advantages of the electric vehicle for this work have not been lost sight of by large users, it is evident, from what has been accomplished, that the gasoline-propelled truck is slowly but surely coming forward, and that 1906 will see it competing in far greater numbers than hitherto. As a rule, builders of touring cars have limited their attention in this direction to the placing of a delivery wagon body on their standard chassis, and have let it go at that; but there are a few exceptions which have amply demonstrated the success that can be expected of the specially designed and well-built gasoline-propelled commercial vehicle. There is little of moment to record where the electric vehicle is concerned, save that it has not stood still, but has advanced, marking time with the other types. Improvement and improvement have, of course, not neglected the standard lead plate type of batter, but changes, where made, have been confined to minor details.


HYDROSTATIC CARBURETER—ONE OF THE FEW DEPARTURES FROM ACCEPTED STANDARDS

One of the greatest developments of the past twelvemonth is that which is apparent on every hand—the tremendous increase in the number of motor-cars of every imaginable type that are at present in daily use. Probably it is safe to say that more cars were sold during 1905 than during the three or four years preceding it. Another is the preponderance of the internal combustion motor as motive power.

Carburetors

The past year has been responsible for so many advances that it is difficult to know where to begin in reviewing them, but, as it must be conceded that carbureter development has practicall yheen responsible for perhaps four-fifths of the improvement made where reliability and smooth running are concerned, it seems natural that this essential should be accorded prominence. The subject is such an extensive one that a comprehensive handling of it is, of course, utterly beyond the limitations of the present article and only the actual advances made can be touched upon.

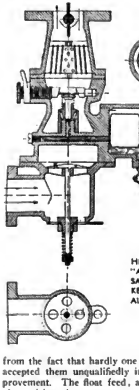

RENAULT CARBURETER

First and foremost, it must be borne in mind that while carbureters galore—the patent records have been swamped with them—have appeared in the past twelvemonth, the majority of them of an improved type, their existence is solely due to a clearer insight into the underlying principles of carburetion than was possible before it became the subject of such intense study as has been given it in the past year. How widespread this has been may best be realized from a glance at the number of patents granted on the Continent for carbureters of varying types during the first half of 1905. Every prominent firm in the industry has from one to a dozen to its credit, nor are there any indications that activity in this direction has ceased, for while the second half of the year was not so prolific in patents, many were issued, some of the later ones covering apparatus of a type totally different from that preceding it, though founded upon the same basic prineiples. The matter of air regulation seems to have come in for the amount of attention it has since been found to deserve, during the same period, and a great number of the patents in question covered auxiliary devices of one kind or another to permit the carbureter to supply itself with air automatically, according as the speed of the motor and the demands of the latter upon it varied. Many of these took the form of a piston actuated by the vacuum created in the body of the carbureter at high speeds. This piston is held in place by the force of a helical spring of determined strength, against which it must act. Its downward travel, caused by the vacuum beneath it, is utilized to open a number of ports. This description of the automatic air regulating device will be found to apply to a great number of carbureters of varying makes, both here and abroad.

Air regulation has, however, not been found to be the only *bete noir* of the designer of a perfected carbureter, and many of the types produced abroad have provided for an automatically variable supply of fuel, as well as air, by the use of a multiple jet carburetor unit of which are brought into action in turn as the speed increases. One jet which is always open takes care of the slow speed and normal supply, the additional ones, to the number of four, as in the Renault type, opening synchronously with an independent auxiliary air port, with one of which each of the series is interconnected.

How well settled and universally recognized are the basic principles of carburetion which have been discovered and repeatedly verified during the past year or so may be best realized

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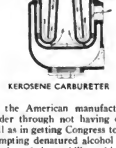


from the fact that hardly one inventor but has accepted them unqualifiedly in attempting improvement. The float feed, auxiliary air supply, raising the temperature by placing close to the cylinders, in the path of the exhaust or water jacketing, is as well recognized and firmly established as if it had been a matter of common knowledge for a score of years, instead of but a few. None of the prominent makers who has essayed improving the carbureter during the past twelvemonth—and who has not?—shows any departure from the beaten path in any of his creations. A radical divergence is represented by the hydrostatic carbureter of French origin which employs the weight of a column of liquid acting upon a metal diaphragm to control the fuel supply, but which in other respects does not differ from current practice. For this change much greater sensitiveness is claimed, but as little or no fault is to be found with the average float feed device on this score, it is not one of great weight or importance. Moreover, so far as is known, this new type has never been adopted as a standard part of the equipment of any maker, so that, on the whole, it may be put down as merely one of the numerous attempts to improve in unneeded quarters.

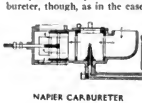
Probably one of the most important developments of the past twelvemonth has been the amount of attention that the possibility, or rather the necessity at some early date in the future, of being compelled to use fuels other than the now omnipresent gasoline, has come in for. It is something that may most logically be dwelt upon under this head, for under existing conditions a substance that is incapable of carburetion has not even a possibility as a motor fuel before it. It must be of a nature capable of being readily volatilized by existing methods or without modifications of the latter that would prohibit its adoption on the motorcar. As is well known, alcohol, kerosene, benzine, and similar volatile liquids, and even crude oil, to a certain extent, meet these requirements in varying degrees.

First in importance among these stands alcohol, the value of which as a motor fuel has been amply demonstrated in the course of several years' experimentation. It has been found to vaporize readily in the ordinary types of carbureter, though, as in the case of the motor itself, a special design is essential in order to utilize its maximum efficiency. Probably more has been accomplished in Germany, both in the way of proving that alcohol, as a fuel, can hold its own with any petroleum product and in making it a commercial product that can compete with other fuels, than in any other country. Much has likewise been done in France to the same end, but the price is still too high to render it a serious competitor of "essence." Carbureters designed to be used with it have been the subject of patents both in Germany and France, but under prevailing conditions it is unlikely that a great deal should be brought forth in this direction until the necessity for it becomes more pressing. It has been found that the ordinary type of motor and carbureter will readily consume alcohol, benzine, kerosene, or other volatile fuel, if supplied while the motor is hot, but that it is extremely difficult and often impossible to start them when cold.

England has had its alcohol propaganda better in hand during the past year than ever before, but so far as experiments are concerned more has been accomplished with kerosene, several carbureters, such as the Bradley and Bryant-Watling here illustrated, having been designed for this purpose. More has been done in this country, however, to render the utilization of alcohol as a motor fuel possible than is generally recognized. At $2 per gallon, its future in this direction is extremely remote, but according to Elihu Thompson it is not alone possible but practical to produce it to sell at 15 cents a gallon on a commercial scale, and an association, behind which are a great number of the most powerful industrial interests in the United States, has expended a considerable sum in educating the producer and user up to a realization of the tremendous dis-


KEROSENE CARBURETER

advantage the American manufacturer is laboring under through not having cheap alcohol, as well as in getting Congress to pass legislation exempting denatured alcohol from taxation. It is hoped that a bill to this effect will go through at the present session. The provision of a cheap supply of alcohol for industrial purposes has a direct bearing on the question of motor-car fuel in more ways than one. Primarily, it is itself recognized as practically on a par with gasoline for this purpose, and on the other hand the existence of such a supply would greatly reduce the present demand for gasoline for purposes for which it is not so well adapted as alcohol, principally in the running of thousands of small stationary engines which have, in German practice, extending over a number of years, proved to be an unqualified success with this fuel. There are a great number of things which might be said regarding the development of the carbureter during 1905 without which an extended review of the subject would be incomplete, but, tersely stated, they may be summed up by calling attention to the fact that the achievements during that time have not been so much in the shape of new discoveries as in the recognition of the value and the better application of those evolved previously. The essential part played by this relatively small part of the motor had never been fully recognized before, and it is safe to say that it is, in very large measure, due to a realization of this that reliability has been so wonderfully increased during the period in question.


NAPIER CARBURETER

Ignition

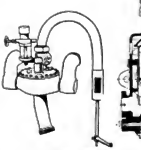
It is but a step from the foregoing subject to this; for, indeed, it is a difficult matter to differentiate between them. Some designers give the carbureter prominence when the vitals of the motive power are under consideration, while others accord it to the ignition, for without it, of what value is the best carbureter or the most reliable supply of fuel? The reverse is equally true, and, so far as the average owner is concerned, both occupy a plane of equal importance in the proper functioning of the motor, as they must when all the arguments *pro* and *con* have been exhausted.

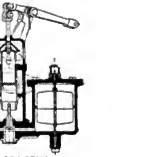
As in the case of the carbureter, it would not be true to state that the extended investigation made of the subject of ignition during the past year has been fruitful of any hitherto unknown or unusually valuable discoveries. Much has been learned, but it has been an amplification of the knowledge of branches of the subject already long familiar. There has been neither an increase nor a decrease in the number of systems available, and all of them are so closely related through having an electrical current as their starting point that, here again, it is frequently a matter of personal opinion as to which is superior. All are possessed of certain advantages that are present in one and not in another.

Starting with the pioneer in the field, that is, the dry battery with a low-tension coil and mechanical igniters actuated by the motor, this may be disposed of by the statement that it is lost sight of. But in so far as what is commonly known as the low-tension make-and-break system of ignition this has come in for more attention than had previously been accorded it by motor-car engineers for some time. It is now, however, used in conjunction with a low-tension magneto, forming what has been demonstrated by experience to be an unusually simple and durable system. From this to the high-tension type of magneto ignition is but a step, although a great deal of complication is added in the process. So far as this is concerned, it is now centered in the generator, which is at once the source of current, the transforming coil, the synchronizer, and the distributor all in one. That having all these parts of the system, that are otherwise distributed over the engine with the attendant risk of frequent short circuiting, self-contained in such a small compass, is an advantage that goes without saying.

Nineteen five was responsible for the almost universal provision, at least on high-priced cars, of at least two forms of ignition, one of which was to be used as a reserve and for starting. In some instances this took the form of two entirely independent systems, even down to the matter of separate spark plugs, while in the majority the fact that the breakdown of the entire system at one time is such a rarity as to be a negligible quantity was recognized and only the essentials most susceptible to injury duplicated.

Vastly more attention has been paid to the subject of low-tension ignition than it had received for fully two or three years previously. That it should have been originally adopted, in some instances, both here and abroad, as practically the sole means of ignition, and still used as was shown on the big racers in the


BRYANT KEROSENE CARBURETER


DE DIETRICH CARBURETER

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Bennett and Vanderbilt races, where reliability counts, is proof positive of its value.

To return to the matter of duplication as a means of insuring the reliability of this essential of the motor, where differing systems were not employed, it was noticeable that two sets of dry cells were provided on light cars and of accumulators on the heavier touring types, with frequently a replacement coil in addition in the case of the latter, this having been made very convenient by the adoption of the unit system of coils in plate of sealing all in one containing case. In the endeavor to bring reliability to the maximum some makers have added an extra plug in series in each cylinder, one being placed at the inlet valve and the other in the center of the combustion chamber, protruding through the cylinder head. This has been done with the double view of making the ignition sure and likewise of accelerating it by firing the charge in two places simultaneously and thus, theoretically at least, making the combustion more complete.

Motors

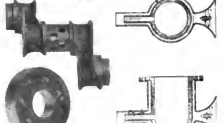
Coming to the motor itself, it would appear at first sight that there is not a great deal to be said on the subject, so far as any actual developments during the past year are concerned, for it has been amply demonstrated that, in the majority of instances where there was fault, it was not the design of the latter, but its accessories failed to properly perform their functions. But in looking over the field there will be found improvements of more or less importance which, while not sufficient to warrant dwelling upon at any length, nevertheless add their mite to the great sum total of advance which has marked the last twelve months.

As the horizontal-opposed motor was the first in the field, particularly on this side of the Atlantic, it may be considered first and it is only necessary to take into account the vast number of medium-priced light cars, sold in 1905 with this type of motor as their motive power, as well as the number of manufacturers who are now making a specialty of building them. But, on the whole, the four cylinder, vertical motor of the four-cycle type has proved itself to be the motive power—the popular one for cars of the heavier and more expensive class.

To the casual observer of the trend of affairs it would appear that the two-cycle principle was in a fair way to remain in the same position at the end of the year that the opening had found it, and, but for the announcement of the makers of the Olds cars, of the addition of a two-cycle model to their line for 1906, the Elmore would have continued to be the only care of any prominence successfully using such a motor. This is a peculiar development, for the boatbuilders, firm in their faith in the efficiency and advantages of the two-cycle principle, have always used it with success with a make-and-break spark, operated off an eccentric on the main shaft, in motors usually not exceeding ten motor-power.

The greatly increased adoption of annular two-point, non-adjustable ball bearings is something that has been extended to the motor, types of ball-bearing crankshafts being features of some foreign cars. Offsetting the cylinders on the crank case, in order to reduce the thrust of the connecting rod against the cylinder wall on the compression stroke is likewise an expedient that has been taken up abroad in a few winstances during the past year, although, in fact, it was originated the year previous.

Where motor design is concerned, there has been little, if any, change from known standards, it being evident that, all things considered, and particularly when space limitation is taken into account, the proportions of diameter to stroke, as well as piston displacement, appear in the light of extended experience, to be as nearly correct as it is possible to make them. At least one radical departure must be noted, and that is the instance of an English builder who has adopted the expedient of casting all four cylinders integral. Considered from many points of view, such as the ability to machine all the cylinders at one operation, impossibility of faulty alignment and the like, the plan is one that offers many advantages, although it must be noted that the tendency is quite the reverse, and, where builders have discarded the twin cylinder castings, they have adopted the



BALL-BEARINGED CRANKSHAFT

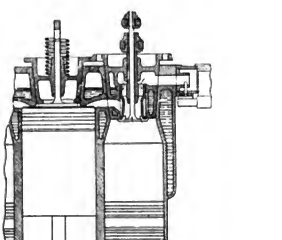
FRENCH AIR COOLING, PATTERNED AFTER FRAYER-MILLER.

independent castings, in which each cylinder is entirely separate.

Probably the experienee of the past year may be said to have demonstrated one thing, over which there has been much divergence of opinion as well as practice on the motor, and that is in the matter of mechanical or automatic inlet valves. It would appear that the latter has lost some of its favor. Where valves are concerned there is another item of design, for the thorough trying out of which the past year may be said to be responsible, although as an expedient it was not a novelty, and that is the use of the variable inlet valve as a means of speed control, a feature of some prominent 1906 types that rendered the use of the mechanically operated valve a necessity.

The subject of compounding is one of comparatively long standing, for, as far back as three years ago, successful types of compound internal combustion motors had been built for stationary power purposes. It is one that has not received a great deal of attention of late, though, aside from the compound of the F. H. V. Co. of this country, the Daimler Company have, according to report, been perfecting the type of compound motor first brought out by them in the latter part of 1904. The design of this is such that the gases are permitted to lose but a minimum degree of their heat and expansion before being passed into the low-pressure cylinder, thus obviating the great drawback hitherto encountered in the design of a successful motor of this type. Should their motor prove the success it is anticipated, it may appear on some of their cars in the near future.

If it has done nothing else, the past year may well be said to have placed air cooling on a higher plane in the estimation of the designer as well as the owner than it has ever enjoyed



DAIMLER COMPOUND

before. The reason is obvious, for heretofore but few prominent makers have pinned their faith to the air-cooled type of motor for all sizes of cars, whereas the opening of 1905 marked the entrance of several into this field, each with a radically differing type—notably the Franklin with its auxiliary exhaust port—some of them of such novel conception that the dyed-in-the-wool adherent of water cooling, who has always looked with suspicion upon all forms of air cooling where he has not openly condemned them, proved more skeptical than ever. But the performances of cars fitted with the air-cooled motor, notably that of the Frayer-Miller and the Corbin cars in the six-day endurance test held in August last, proved beyond a doubt the merits of their claim to recognition The fact that both of these air-cooled cars easily surpassed, by a wide margin, the record of one of the water-cooled type of foreign make of several times the price, established the year before, speaks for itself. The consistent record of success achieved by air-cooled motors of different types in this country has awakened interest in the subject abroad, though there is at present not more than one or possibly two makes of air-cooled cars in England, while France has yet to produce a pioneer of this class, although more or less experimenting on the subject has been carried ont in that country during the past year.

Last, but not least by any means where the gasoline motor is concerned, 1905 has marked the opening of an era in which its superiority to steam as a prime mover for small units is being generally recognized. Evidences of this are to be found principally in its adoption by several of the prominent railroads in the western part of the United States as a motive power on branch lines or feeders. Experiments along this line have been carried on in England for some time and were long since proved to be an unqualified success, as have those undertaken in this country, and other roads are preparing to follow in the footsteps of those referred to. The year was further responsible for the launching of the first gasoline locomotive, the design of which, it must be admitted, follows somewhat slavishly that of its steam predecessors

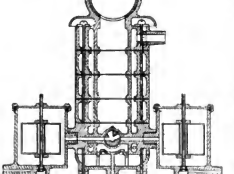
Clutches

Coming to the next step from the motor, the clutch, numerous attempts at improvement are in evidence, though it must be admitted the old rudimentary form, the leather-faced cone, still

(Continued on page 148.)



DENNIS BUS WORM DRIVE

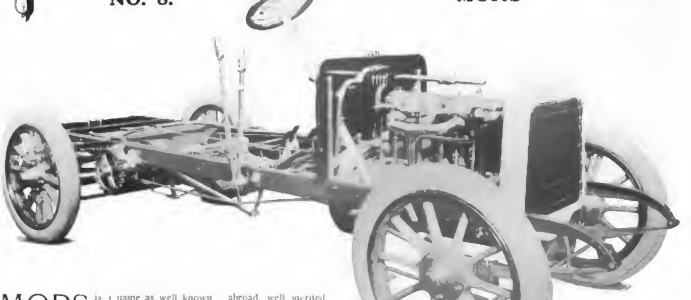


TWOMBLY KEROSENE CARBURETER, IN WHICH THE MOTOR STARTS ON GASOLINE

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MODERN MOTOR CARS.

NO. 8. MORS



MORS is a name as well known in electrical circles of France as the name Morse in similar circles is here, and as a natural result the two names are often confounded. The Societe Anonyme D'Electricite et D'Automobiles Mors was founded in 1851, and at that time was wholly engaged upon electric installations, bells and telegraph apparatus. In 1874 all this was changed and considerably augmented. A huge plant was established at Ivry-sur-Seine to produce and install block signal railroad apparatus, but even this plant outgrew its facilities so that in 1881 a new works was established at Paris Grenelle. In 1887 the making of motor-cars was added to the business, and their first steam cars were built and exhibited at the Universal Exposition of Paris in 1889. In 1895 the production of steam cars was abandoned and the manufacture of cylinder-fired, gasoline cars on a large scale was undertaken which up to the present time has continued to increase in volume.

In 1898 the original firm was transformed into a limited liability company which now has a capital of four million francs, illustrative of what large results are produced from small beginnings. It is interesting to note that in 1851 the employees numbered 10 only; in 1874, 50; in 1881, 100; in 1895, 250; in 1900, 700; and since 1903 their army of workmen consists of 1,200 people.

Their exhibition awards have been numerous and their success in the principal road events abroad, well merited, consisted of first places in the 1900 Paris-Toulouse-Paris; in 1901, Paris-Bordeaux; in 1901, Paris-Berlin; in 1903, the ill-fated Paris-Madrid, the first stage of which was only run; and in 1904 Mors cars represented France in the Bennett race.

In this country the Mors cars were among the earliest of those imported and they have always been exhibited at every New York show. In 1901 Henry Fournier, on a Mors 42-m.p. racer, made a mile straightaway road record on the Coney Island Boulevard in 51 4-5 seconds, and Foxhall Keene, also on a Mors, did a mile in 54 2-5 seconds.

Let us leave reminiscent history, because that is a sign of age, which we desired to obviate, and turn to their present production. Constructor Mors was always a leader rather than a follower, and it is instructive and interesting always to follow out the theory and practice of a constructor's ideas in his poems of steel, to see where they lead to, because as Emerson said in "The Problem," "He wrought in a sad sincerity, he builded better than he knew . . . . (and) to beauty grew."

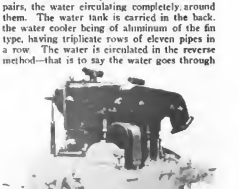
The new Mors models shown for the first time at the London and Paris shows, are of 14-20, 24-32, and 40-32 m.p., the last-named being a new type with bore of 125 mm. and stroke of 150 mm., the 24-32 having a bore of 110 and stroke of 150, rated as a 55-mile an hour car. The 14-20 model is a peculiarly interesting car at this stage of the game, because it is a typical "town car," by which is meant that it is intended to be fitted with enclosed bodies of the Landaulet and Limousine types, and yet notwithstanding its low power, its efficiency is so great that it is necessary to hold it under control in order to keep within urban speed limitations. Low-powered town cars will be a feature of the 1906 productions, not alone of the Mors make, but of others also, especially among the imported cars, their low price, low cost of maintenance and operation commending them.

The original features of the Mors cars, such as the direct drive on a chain driven car, which they introduced in the Paris and Vienna race in 1902; the low tension make and brake magneto, and their *désaxé* construction of the crank shaft, which means that its axis is tangential to the cylinder axis, are of course retained. This construction, which has been largely copied since in gasoline motor construction, is also used in Westinghouse high speed steam engines. It diminishes the side thrust of the piston in the cylinders, equalizing the side thrust of the working stroke, and ditto that of the up-stroke, producing a balanced motor, the decrease of the thrust being downward and the gain being upward, the thrust of the connecting rods during the working stroke being wholly vertical.

One of the illustrations of the motor shows the positions of the connecting rods, their wide bearings, and also shows how the crank shaft bearings are supported from the top of the crank chamber, so that the whole of the base of the crank chamber can be removed for inspection. Another one of the illustrations shows how the lubrication of the crank shaft bearings is positively affected by the ratchet wheel rotary oil pump, and that all the gears are enclosed. The cylinders are now cast in pairs, the water circulating completely around them. The water tank is carried in the back, the water cooler being of aluminum of the fin type, having tripliciate rows of eleven pipes in a row. The water is circulated in the reverse method—that is to say the water goes through



FRONT VIEW OF MOTOR, SHOWING COVER OVER END OF SHAFT FOR ATTACHING COMMUTATOR FOR BATTERY IGNITION



SIDE AND END VIEW OF MOTOR, SHOWING ROCKER ARM OPERATING THE PUMP

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the tank to the pump and through the radiator to the bottom of the cylinder and then out again to the top of the tank, producing a steady fall, a peculiarity of the water cooling apparatus being that a fan is not necessary owing to the natural draft.

The hood consists of a light metal apron hinged at the top, while the bottom of eranK ease is covered with a light metal apron which extends from side to side of the frame directly under the motor, so that all the air that is allowed to pass to the bonnet must first pass through the radiator, and out by way of the rear of the motor, the spokes of the flywheel being made on an incline, and fan-shaped, so as to allow a free passage of air, no extra fan, as is usual behind the radiator, being therefore needed.

The interchangeable inlet and exhaust valves are located on opposite sides. The inlet valves have a variable lift and a compression cam is fitted for ease in starting the car. A lever is fitted beside the frame alongside of the radiator, which lifts the exhaust valves, preventing the motor from racing, excepting temporarily when first started with the throttle; a wire terminating in a ring is placed close to the starting handle, the drawing out of which holds the throttle valve wide open and when pushed back to position it returns the throttle to the position already predetermined by the lever on the steering wheel. The tappet rods on the valves have a hardened steel roller on their lower ends, which work on the cam shaft. The parallel rocker arms on the tappet rods are adjustable for position, and are earried—as shown in the illustration of the ignition side of the motor—in long metallic tubular guides filled with oil, the final adjustment being by long helical springs.

The valves being placed on opposite sides are certainly accessible, each one being readily examined by removing a plug fitted in the cylinder-head directly over the valves, the valves being interchangeable making an added convenience.

The Mors automatic, inlet-valve carbureter, which they have always used and which, like other Mors features, is largely copied, is of the usual float-feed type with two air inlets, one of which is partly covered with an adjustable cover set to position when the car leaves the factory so as to give the best results. The other inlet is spring controlled, the amount of opening depending on the suetion pull of the motor. The gasoline feed is by gravity from the tank under the driver's seat to the single jet spraying chamber of the carbureter. The carburetor is water jacketed and a large four-way copper induction pipe leads the mixture from the cylinder to the mixing chamber in which is located a butterfly throttle valve, worked by a lever on the steering, the accelerator pedal and the clutch pedal, all of these being connected by stranded wire cables.

Now this carburetor is doubly interesting, because the automatic throttling of the mixture also controls the throttling of the air supply at the same time, having thus all the advantages of the so-called automatic carbureters, yet being absolutely mechanical in its control, which is by means of the throttle coming from the steering wheel by a ratchet and also by a foot pedal, it being borne in mind, however, in speaking of the throttle that the active throwing out of the clutch shuts down the throttle, and prevents the motor from racing, no matter where the throttle may bet set by the lever on the steering wheel, so that the operator has absolute control over the vehicle at all times.

The exhaust gases pass into a chamber fitted with projecting radiating ribs to an exhaust pipe of large diameter, thence to a large silencer in the rear so that the gases really pass through three expansion chambers, giving noiseless running without back pressure. The oil pump is gear driven, but drops by gravity, having three feeds, one to the piston and two to the crank case. The oil droppers, which can readily be held in the palm of the hand, are, with the safety cut-out, the only thing on the dashboard which is, without exception, the plainest and simplest which we have ever seen —quite a contrast indeed to the metallic dish-pan dashboards which are filled to overflowing with mechanical contraptions.

The oil pump is driven by a pair of and ratchet operated from the inlet valve eam shaft, the gear box using heavy oil for lubrication, it being fitted with Hess-Bright ball bearings, as are the wheels, ball-bearings, in fact, being used all over with the single exception of the motor. The oil pump is so arranged that in case of an overflow it is taken care of by an extra tank, but should the oil system become mechanically inoperative a convenient hand lever on the dash may take eare of the oiling.

The flywheel clutch of large diameter, with external spring, well known as an original Mors feature, is of the magnetic metal to metal cone type, being especially arranged for quick adjustment, detachability and accessibility.

The drive is taken from the clutch through two universal joints which are self-centered when the clutch pedal throttles the motor, the drive being taken from the gear box, to the countershaft and side chains to the rear driving wheels. Just above the flywheel on the cross member of the frame is carried a brass plate forming an arc of a circle there, and on which is indicated the correct timing position for firing each eylinder, so that in case of dismanting the motor, the timing will not be disarranged in assembling again. There are four forward speeds and a reverse, the fourth speed being the high speed. All the speeds are operated by a one-side lever, the direct drive to the differential driving through a bevel wheel on the top speed, the other three speeds being produced by a sliding sleeve on the first motion shaft which disconnects a positive dog clutch on the direct drive, and drives the counter-shaft by the second shaft operating its own bevel wheel on the differential casing, so that the direct drive is on the top speed, but once removed from the other three, the reverse being procured by plaeing a gear wheel between the two shafts in the usual way.

The gear box is unusually flat and low, the gears being carried, as will be noted by the description, side by side. The control of the car is very simple. There is a brake foot pedal provided, one clutch pedal, and a broad countershaft brake, the emergency brakes being internal—expanding on drums on the rear wheels, the side brake levers being interconnected with the two clutch cones.

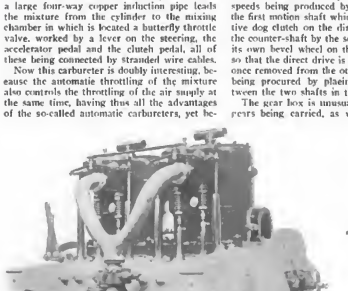
The motor control is wholly by the throttle on the carburetor, a butterfly throttle valve in the induction pipe having three wires operated from the clutch, the accelerator pedal and a lever working on a ratchet on the steering wheel. Pulling out the clutch slows the motor down somewhat by partly closing the throttle, but in case of a hurried start the motor can be accelerated previous to laying in the clutch, by the accelerator pedal, it being a well-known fact, writing of this control, that all-day runs have been made in heavy traffic on a Mors car on the direct drive high gear.

Consequently no automatic method of governing is needed, it having been found that the method described above produced less complication, is more than satisfactory from every point of view, and at last, but not least, is very economical in gasoline consumption.

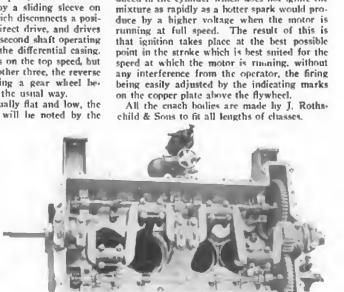
The pressed steel frame has side members tapering towards the front and rear, offset enough in front to give a big sweep to the front wheels, the front end of the frame carrying the front springs which are the longest front springs made. The rear springs are carried outside the frame and are hung from shackles at both ends, the transverse spring working in a ball-bearing guide to take away the friction. All the wheels are 860 mm. x 20 mm. in size. The axles both front and back are of solid section, the front one having graceful curves to it.

The magneto is geared level with the motor, and is of the low speed type; the wiring, a very simple one indeed,is carried to a bushar on top of the motor with two snap eatches. The magneto is driven from the exhaust valve eam shaft by gears. Some idea of the simplicity of the wiring may be had when it is noticed that only one lead is taken from the magneto, the spark being produced in the cylinder between the adjustable plugs and the cylinder heads, the tappets being operated, as mentioned before, by rods from the inlet valve eam shaft, the suddenness of the break being adjusted by not only the rods but by the plug in the cylinder head. Other outside means of adjusting the ignition are not needed, as the voltage of the current from the magneto depends upon the speed of the motor. As the motor speed decreases the voltage, of eourse, also decreases and as a result a spark not so intense is produced in the cylinder which does not ignite the mixture as rapidly as a hotter spark would produce by a higher voltage when the motor is running at full speed. The result of this is that ignition takes place at the best possible point in the stroke which is best suited for the speed at which the motor is running, without any interference from the operator, the firing being easily adjusted by the indicating marks on the copper plate above the flywheel.

All the enach bodies are made by J. Rothschild & Sons to fit all lengths of chasses.



RIGHT SIDE OF MOTOR, SHOWING CARBURETER, OIL FILLED GUIDES OF VALVE RODS, AND MAKE AND BREAK IGNITION APPARATUS



MOTOR LYING ON SIDE SHOWING BOTTOM VIEW OF CRANK SHAFT WITH ITS WIDE BEARINGS, POSITION OF PISTON RODS, CAM SHAFTS, GEARS, AND ARMS OF CRANK CASE

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Mechanical Briefs of 1906 Models

SIX CYLINDER FRAYER-MILLER

THE Oscar Lear Automobile Company, of Columbus, O., have had their six-cylinder car in use by one of their customers during the last two months, hence this car is believed to be the first American-made, six-cylinder car now actually in the hands of a purchaser. The new car has a wheel base of 109 inches, a tread of 56 inches, the wheels being 34 x 4. The six-cylinder motor has cylinders 4 1-6 x 5 1-8, which are arranged tandem or fore and aft style, developing 36 motor-power, using a flywheel of one hundred pounds weight.

Ignition is by jump spark, storage battery, dry battery, or magneto, as preferred.

The same cooling construction as in their former motor-cars is used, that is, cylinders vertical, each cylinder being surrounded by a cast aluminum casing, air blast from blower in front conducted to the tops of the casing and forced down inside to the bottom of the casing. The cooling projections are cast on the sides of the cylinders, are quite short and small, being about 1-4 inch in length. The air is supplied by a new form of fan which is 10 inches outside diameter, with vanes 3-4 inch radial width very closely placed, the vanes being given an angle of about 25 degrees in the direction of radiation. The makers have found this form to be more effective than any other tried, and secure about 2 ounces air pressure in the bus pipe, which is found to be ample to keep the motor perfectly cool, as it is volume of air that is needed, not pressure.

The cylinders use comparatively high maximum compression, about 75 pounds, but the



FRONT VIEW OF THE CHASSIS SHOWING THE AIR BLOWER

cooling is done so effectively that the exhaust valves do not show high temperature under any circumstances, and do not need regrinding except at extremely long intervals.

Dry cells are used regularly, but either storage battery or magneto can be fitted to order. There is almost no vibration in this six-cylinder motor, and numbering the cylinders from front to rear, 1, 2, 3, 4, 5, 6, they are fired in the following sequence, No. 1, No. 5, No. 2, No. 4, No. 3, and No. 6.

The six-cylinder motor, the makers claim, is superior to the four-cylinder motor for evenness of motion particularly on light



SIX-CYLINDER FRAYER-MILLER CAR

charges, as under such conditions four-cylinder impulses can be plainly felt, and with a six-cylinder motor there is no perceptible vibration in driving effectively at extremely low speeds, the Frayer-Miller six-cylinder car running with certainty at 3 or 3½ miles per hour on 3d or 4th speed. The Frayer-Miller motor runs perfectly with 75 pounds compression and, owing to the freedom from heavy cast water-cooled construction, a saving of notable proportions is made in the weight. Seventeen Hess-Bright ball-bearings are used.

The new change-speed gear is of the selective type, 4 speeds forward and reverse, all bearings of Hess-Bright construction. This change gear is of their own construction, very well made, all gears being perfectly hardened, and the moving parts running in oil. The modified H slot which governs the gear-shift lever action is very simple and easily handled. All gear shifts can be made silently on the road at all speeds.

The front axle is of I section steel forgings, the wheels running on Timken roller bearings. The divided rear axles are carried on Hess-Bright bearings. The drive shaft where it enters the rear axle has three Hess-Bright bearings, two above and one below the drive pinion. The frame is of pressed steel, parallel sides, with short sub-frame members to take the motor only. One of the features of the car this year is the mud-guard extension which is carried clear to the frame so that it is impossible to splash any mud on the passengers on the front seat.

The chassis is fitted with a side entrance tonneau body seating five passengers comfortably, the rear cushion measuring 51 inches on the inside, the car complete weighing about 2,500 pounds, the cost of such a car being $4,000, with a full equipment including five lamps, horns, tools, etc.

The spring suspension is half elliptic in front, and full elliptic in the rear, 41 x 2 inches in front, 40 x 2 inches in the rear.

In addition to the six-cylinder car a four-cylinder touring car having the same size cylin-



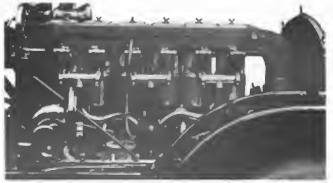
PARTS OF THE MOTOR

ders, same gear, change box and rear axle, to sell at $3,000, will be made. This will be a five-passenger car, wheel base 100 inches, gauge 56 inches, wheels 32 x 4, weight 2,600 pounds.

The Frayer-Miller car, it will be remembered, made a great record in its metropolitan publicity debut last September, in the Long Branch economy and endurance contest, where it carried off the premier honors from the whole field.



EXHAUST SIDE



FRAYER-MILLER MOTOR

INLET SIDE

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Mechanical Briefs of 1906 Models

GALLIA AND GALLIETTE ELECTRICS

"CARRYING coals to Newcastle," comes to mind in considering the importation of a French electric car, but further consideration shows that the idea is eminently practical after all, because both New York and Paris lead the world in this type of motor-cars, and if American electric cars are sold in Paris, why French electric cars may be sold in New York.

The principal characteristics of the electric motor-cars manufactured by the Societe l'Electrique of Paris, and styled the "Gallia," are as follows: The hind wheels are the drivers, with the result that the front wheels have a greater turn, the steering is easier, and it is possible to turn the carriage in a shorter radius. As the patented suspension of the motors permits



GALLIA LANDAULET

of an independent motion of the chassis upon its springs it causes the carriage to run with extreme smoothness. The motors are placed in the rear, a position that experience has shown to be effective.

In order that a differential may be dispensed with, the wheels are actuated directly by the motors, which are of the compound type, completely enclosed. All the parts are protected and easily accessible. The motors oscillate around a horizontal axis. A pinion, carried by the shaft, meshes directly with a circular rack secured to the inner face of the wheel.

The controller, which is extremely simple, is wide enough in diameter to allow the contacts to have sufficient surface and be placed at some distance from each other. In this way the driver can pass from one speed to the following without jerks and avoid burning the contacts.

In addition to the reverse and the zero, the controller permits of establishing eight combinations, giving six speeds and two positions of breakage and recuperation. The control of the apparatus, under the hand wheel, is effected by a lever.

The accumulators in the current types of carriages have capacities varying from 140 to 250 ampere hours. They are contained in two boxes of equal size, one of which is placed in front, and the other in the back part of the carriage. They are easily accessible and can be readily taken out of the vehicle. These accumulators, called "Ajapa," are of the pasted oxide kind. There are three types of them, each corresponding to a certain type of carriage. Not the least interesting thing about them is that they are capable, without abnormal wear, of supporting rates of discharge double or triple their normal rate, and of receiving for an hour a charge equal to a third of their capacity, and, finally, that as the two plates, positive and negative, wear equally, an "Ajapa" battery can easily give from two hundred to two hundred and fifty discharges.

The carriages are provided with a special starter, actuated by the left foot through the medium of a pedal, which permits of a rapid but progressive start without jerks.

The brakes are five in number: (1) An electric one in front and rear upon the driving wheels; (2) a recuperating one for automatically slowing up the carriage on down grades; (3) a moderating one, due to the use of the starter; (4) a mechanical foot brake, which blocks the hind wheels in both directions, and at the same time breaks the current through an interrupter, and (5) a mechanical hand brake, distinct from the preceding, producing similar but more powerful effects.

The chasses are of steel plate and Z-angle iron, connected by cross braces. Their rigidity is absolute. They are so constructed as to receive a body of any form whatever without undergoing any change, and may be furnished with interchangeable bodies. They may be straight or curved, and may be carried by wheels of either uniform or unequal size.

The speed of the carriages varies normally from two and one-half to nineteen miles, but it is possible to attain greater speed without any change. The makers have recently brought out a new type of light and fast-running carriage, with seats for two or three persons, which permits those of little experience, after a single lesson, to do their own driving with as much precision as can be attained by a professional chauffeur. This vehicle, styled the "Galliette," is provided with a battery of "Ajapa" accumulators that permit of a run of fifty-five to sixty-two miles without recharging, and, with regular rechargings at noon and 7 o'clock, a run of seventy-five to eighty miles.

The chassis is of U-iron, strongly constructed, and is provided with four wheels of uniform size. A single motor, fixed beneath the chassis, controls the hind wheels by means of a cardan transmission.

For the purpose of simplicity this carriage is provided with two speeds forward and one reverse. The change of speed is obtained by means of a lever, but all the intermediate speeds, from zero to fifteen miles, are obtained by means of a special pedal, placed under the left foot, so that a good driver scarcely ever has to touch the lever on the route. The lever serves only as a safety apparatus, when the carriage is standing still, to cause it to run backward or forward.

The driver has at his disposal two mechanical brakes, one of which is a winding one that acts upon a drum secured to the shaft of the armature, and is actuated by the right foot. The second acts upon the hind wheels through the intermedium of a lever placed alongside of the maneuvering lever. These brakes likewise control two breakers that break the current as soon as the action begins to be exerted. They bring the carriage to a stop immediately, whatever be the direction of running.

The motor is excited in series, and has an armature provided with a Siemen's short wind ing. The carbon brushes keyed upon this armature are easily accessible. Moreover, the special arrangement of the brush carriers assures a regular running of the motor. Two speeds forward and one reverse can be obtained by means of a maneuvering lever, but the controller is actuated by a pedal that permits of speeds up to fifteen miles an hour.



GALLIA ACCUMULATOR

The accumulators of the "Galliette" are divided into two boxes, one of which is placed under the hood and the other under the front seat, so that the inspection of them is rendered very easy. They are of the same type as those employed on the "Gallia."



GALLIETTE

A measuring apparatus, fixed to the dash, shows the state of the batteries and the consumption of the carriage at all times. Upon the dash, too, are fixed the interrupter of running, and the interrupter of light, which assures the lighting and extinction of the lamps.

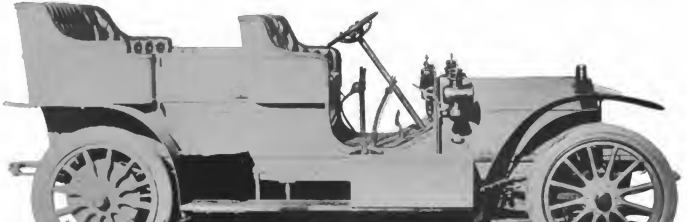
The chasses are capable of receiving different types of bodies, according to the order of the purchaser—such as the Victoria Tonneau, a cab to be driven from the interior, etc., or a delivery body with thirty-five cubic feet for the load.

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Mechanical Briefs of 1906 Models

VIQUEOT

VIQUEOT, a French car, built of course on the most approved French designs, is another newcomer bidding for the favor here which it has enjoyed in its own country for the past eight years. The makers of the Viqueot have been long and intimately connected with the motor-car industry of France, producing the finest parts possible, such as cylinders, cranks, connecting rods, and pistons for some of the greatest French motor-car building concerns, meanwhile building complete cars under their own name. That the car will be well handled is evident when it is stated that the Viqueot Company is headed by Mr. Hector H. Havemeyer, as president and treasurer, he long having been identified with the industry as vice-president and treasurer of the Vehicle Equipment Company, and moreover well known as a financier and capitalist. He is now in Paris arranging for early deliveries during the coming season; meanwhile the cars are being shown at their New York city offices and warerooms, 215-217 West Forty-eighth street, by Mr. L. S. Caswell, general manager of the company, who for eight years was with the Electric Vehicle Company and for two years with the Hayden-Ames Company. With this brief introduction as to the history of the company and the personality of its sponsors, let us take a look at the car itself.



40-45 M.P. VIQUEOT

Two models are made, a 28-32 and a 40-45 motor-power. At present the chassis and the bodies are imported in the rough complete, but the idea is to bring over in future only the chassis and allow the purchaser to select the body to suit his requirements, which will be made to order by some of the great carriage body makers of New York. A pressed steel frame is used, carried on long semi-elliptic springs fastened by gracefully curved but strong dumb irons to the body. Both axles are of I section forging, carrying wheels fitted with 34 x 4½-inch tires, the wheel base being 119 inches. The four separate cylinders of the motor are cast integral with heads, water jackets, inlets and exhaust valve chambers, the valves located on both sides of the cylinders, the valve openings being so arranged that the valves are readily removable and interchangeable, besides being mechanically operated from separate cam shafts, the cam shafts themselves being driven from the front of the crank shaft by large, noiseless fiber pinions meshing into the two shaft gears, a peculiarity of the aluminum gear cases being that they are only semi-enclosed, being carried on studs extending from the crank casing itself. There is no good reason why the cam gears should be wholly enclosed, the semi-enclosed method permitting of ready examination and access at all times. The crank case chamber is of aluminum in two parts, the hand hole in the base allowing of easy access. The crank shaft has three ball-bearings. Cam shafts and cams are situated in individual chambers alongside the crank case, the upper half of which is in two parts, each part covering a pair of cylinders and being readily removable. Brass push rod guides are fastened to the upper halves of the cam shaft housing, and these push rods are fitted with cam rollers. Heavy H-shaped arms or lugs are cast on the upper part of the crank chamber and the ends of these arms are carried in the channels of the side frames.

The carburetor has a water jacketed mixing chamber, the water being carried around by small copper tubes through the carbureter jacket, the water coming directly from the cylinder jackets, and joining the water circulation again near the suction part of the chamber. A bypass, however, is used to stop the flow of water when necessary.

An original feature of the carburetor is that the float is of annular form, the float chamber surrounding the mixing chamber. The gasoline admission to the float chamber is at the bottom of the carburetor. A 15-gallon gasoline tank is carried under the front seat, high enough to permit of gravity feed to the carbureter. The fuel admission to the carbureter can be shut off by a valve under the footboard.

A sliding type of throttle valve is used, which is located in the brass inlet pipe between the carbureter and the aluminum inlet manifold. The throttle valve connects through a link and lever to the centrifugal governor, which is carried upon the forward end of the inlet cam shaft. The lever in the connection between the throttle and governor is double armed, and its downwardly extending end connects by a Bowden wire to the throttle lever on the steering wheel, by which the action of the governor may be reduced.

Ignition is by an Eisemann high tension magneto located at the inlet side of the engine and driven from the cam gears with two storage batteries for starting and reserve. The storage batteries are carried on the running board, while the coil and switch are secured to the dash. The commutator is on the top of a vertical shaft driven by enclosed bevel gears from the rear end of the inlet cam shaft, making it accessible. It consists of a cylinder of hard fiber, with a metal contact sector, against the outer circumference of which bear four radial contact brushes, the holders of which are secured in a cylindrical housing of insulating material with a plate glass front for observation. The spark is advanced by a lever on the steering wheel, from which connection is made to the commutator by means of a Bowden wire. The spark plugs are screwed into the center of the cylinder heads.

The cooling system consists of a tubular radiator in which a sheet metal strip is soldered between the flanges of adjacent tubes. The cooler connects with the cylinder jackets and these pump through copper manifolds and tubes. The pump is of the centrifugal type located at the exhaust side of the motor, being driven from the exhaust cam gear. A belt-driven fan is located back of the radiator.

One of the features of the car is its motor lubricating system. At the exhaust valve side of the motor crank case is located a piston pump operated from an eccentric on the exhaust cam shaft. This pump draws the oil from the bottom of the crank chamber and delivers it into a reservoir attached to the front side of the dashboard, from where it flows by gravity—or, under the pressure developed by the pump—to the crank and cam shaft bearings. Five copper tubes lead from the reservoir, three to the crank shaft bearings and two to the cam shaft housings, the latter two branching to each of the two separate compartments for each cam shaft. The crank shaft is drilled through its journals and short arms, and the crank pin bearings are oiled from the feed to the main bearings.

The flywheel of the motor is bolted to a flange formed on the crank shaft, and is bored out to a taper to receive the leather-faced clutch cone of aluminum. The clutch shaft is hollow, containing the clutch spring on the inside. The clutch is disconnected by means of a pedal on the left side of the steering column. This pedal, like the brake pedal, located on the right of the steering column, is mounted on a tubular pivot shaft connected by a link and lever mechanism to a groove on the rear end of the clutch shaft, by which the clutch can be drawn out of engagement with the motor flywheel. A universal joint is placed in the hollow clutch shaft to prevent binding of the bearings.

The change speed gear is of the sliding pinion type, giving three speeds forward and reverse, with direct drive on the high gear, by a single, sliding member controlled by the operation of the gear changing lever. The gear is enclosed in an aluminum box in two halves.

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1906

THIRD MOTOR ANNUAL

Illustrated Motor-car Directory.

IN the following pages, for the third time, MoToR presents its Annual Illustrated Motor-car Directory, in a new, larger, and nearer complete form than ever before. It is, indeed, a *magnum opus*, and will be inseparable from the motorist who "wants to know." Neither time, labor, nor expense has been spared in the preparation of this directory. While we are not infallible, the omissions, due to a few motor-car makers not being prepared to furnish text and illustrations required, are so negligible as scarcely to need the phrase "E. and O. Ex." The illustrations missing from their positions alongside the text, will be published later when ready. We feel sure that you, the user of this symposium of motor-car information, will find it meets your expectations and needs, not only when the manufacturers who may not be represented in it now have enabled us to make this directory absolutely complete, but also in its present form from which no maker is omitted, through anyone else's fault than his own. Forty-two pages are devoted to the directory, a whole magazine in more senses than one, three hundred and twenty-five cars representing the output of one hundred and thirty-seven makers being illustrated, described and arranged under separate price classifications and index, reflecting the glorious growth and superb status of the motor-car industry in half a decade.

ALL the manufacturers of motor-cars, foreign and domestic, little and big, advertiser and non-advertiser, licensed and unlicensed, builders of pleasure or of business cars, of gasoline, steam or electrically propelled vehicles, are here represented, every one, each class under its proper classification. The directory includes everything that will be shown at the three big national shows and at all the local shows, and, in addition to these, a number of cars that will not be exhibited at any of the shows. So that the motorist who is unable to visit any of the exhibitions will find in this directory a summary of all the information that he could possibly gather were he an attentive and discriminating visitor at all the shows in the land, all of which can be gleaned at his own fireside and at his own leisure, whereupon, if further interested, he may send for the catalogues of those makes of cars which appeal to him. But this directory can in no way substitute an actual personal examination and demonstration of a motor-car, but will be an invaluable aid in making from among the cars of the year, a selection of those to which special attention is later to be given, either at the shows or in the dealers warerooms. In conclusion MoToR offers this wholly altruistic effort to the sport and industry coupled with its heartiest wishes for a pleasant, prosperous and "Happy New Year."

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Orient. Model BB, Buckboard, 4 M.P. Waltham Mfg. Co., Waltham, Mass.



PRICE—$400.
BODY—Wood.
SEATING CAPACITY—Two persons.
FRAME—Hickory reaches.
BRAKES—Hub bands.
TIRES—26 x 2¼, single tube.
CYLINDERS—1, in rear.
COOLING—Air, with fan.

IGNITION—Dry battery.
TRANSMISSION—Friction.
SPEEDS—Forward and reverse.
DRIVE—Double chain.
WHEEL BASE—82 inches.
TREAD—42 inches, optional 56 inches.
WEIGHT—600 pounds.

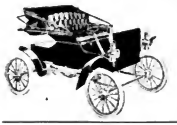
Ford. Model N, 15 M. P. Ford Motor Company, Detroit, Mich



PRICE—$150.
BODY—Wood.
SEATING CAPACITY—Two persons.
FRAME—Iron.
BRAKES—Hub.
TIRES—28 x 2½.
CYLINDERS—4 vertical.
COOLING—Water.

IGNITION—Batteries, dry cells.
TRANSMISSION—Planetary.
SPEEDS—2.
DRIVE—Direct.
WHEEL BASE—78 inches.
TREAD—56 inches.
WEIGHT—700 pounds.

Monarch. Model Runabout, 7½ M. P. Monarch Auto Co., Aurora, Ills.



PRICE—$500.
BODY—Piano box pattern.
SEATING CAPACITY—Two persons.
FRAME—Angle iron.
BRAKES—Foot and emergency.
TIRES—28 x 2½.
CYLINDERS—1 horizontal.
COOLING—Air.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—68 inches.
TREAD—55 inches.
WEIGHT—900 pounds.

Walker. Model B, Runabout. Walker Motor Car Co., Detroit, Mich.



PRICE—$550; after April 1, $600.
BODY—Wood, runabout.
SEATING CAPACITY—Two persons.
FRAME—Angle steel.
BRAKES—External on hub.
TIRES—28 x 3.
CYLINDERS—2, opposed.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Toggle joint.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Direct.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—600 pounds.

Gale. Model C, 8 M. P. Western Tool Works, Galesburg, Ill.

PRICE—$600.
BODY—Wood, wide, undivided seat.
SEATING CAPACITY—2 persons.
FRAME—Angle and channel steel.
BRAKES—External differential band and on transmission.
TIRES—28 x 3 inches.
CYLINDERS—Horizontal single cylinder.
COOLING—Water.

IGNITION—Jump spark, 2 sets dry cells.
TRANSMISSION—3 pinion spur gear, tight case.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—73 inches.
TREAD—54½ inches.
WEIGHT—1,100 pounds.

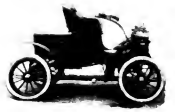
Oldsmobile. Model B, 7 M. P. Olds Motor Works, Lansing, Mich.



PRICE—$650.
BODY—Wood, piano box.
SEATING CAPACITY—Two persons.
FRAME—Angle steel.
BRAKES—Transmission and rear hub.
TIRES—28 x 3.
CYLINDERS—1 horizontal, under body.
COOLING—Water by gear pump through copper disc.

IGNITION—Jump spark, dry cells.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Chain.
WHEEL BASE—66 inches.
TREAD—55 inches.
WEIGHT—1,100 pounds.

Northern. Model Runabout, 7 M. P. Northern Mfg. Co., Detroit, Mich.



PRICE—$650.
BODY—Wood.
SEATING CAPACITY—Four persons.
FRAME—Side spring.
BRAKES—Rear axle.
TIRES—28 x 3.
CYLINDERS—1, horizontal.
COOLING—Water.

IGNITION—Jump spark and batteries.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—70 inches.
TREAD—56 inches.
WEIGHT—1,000 pounds.

Gale. Model D 8, M. P. Western Tool Works, Galesburg, Ill.

PRICE—$650 (with top curtain and storm apron).
BODY—Wood, wide, undivided seat.
SEATING CAPACITY—Two persons.
FRAME—Angle and channel steel.
BRAKES—External, differential band and on transmission.
TIRES—28 x 3 inches.
CYLINDERS—Horizontal single cylinder.
COOLING—Water.

IGNITION—Jump spark, 2 sets dry cells.
TRANSMISSION—3 pinion spur gear, tight case.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—73 inches.
TREAD—54½ inches.
WEIGHT—1,100 pounds.

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Reo. Model B, 8 M. P. — Reo Motor Car Co., Lansing, Mich.

PRICE—$650.
BODY—Wood.
SEATING CAPACITY—2 persons.
FRAME—Angle steel.
BRAKES—Band on rear wheels.
TIRES—26 x 2.
CYLINDERS—1, horizontal.
COOLING—Water, gear pump (positive).

IGNITION—Jump spark, dry batteries.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary gear.
SPEEDS—2 forward and reverse.
DRIVE—Direct, single chain.
WHEEL BASE—76 inches.
TREAD—55 inches.
WEIGHT—950 pounds.



Holsman. Model No. 3, 10 M. P. — Holsman Automobile Co., Chicago, Ill.

PRICE—$650.
BODY—Piano.
SEATING CAPACITY—Two persons.
FRAME—Tubular.
BRAKES—Rim.
TIRES—1¾ inches.
CYLINDERS—2, horizontal opposed.
COOLING—Air.

IGNITION—Jump spark.
TRANSMISSION—Steel cable.
DRIVE—Direct.
WHEEL BASE—66 inches.
TREAD—56 to 62 inches.
WEIGHT—800 pounds.



Reo. Model B, 8 M. P. — Reo Motor Car Co., Lansing, Mich.

PRICE—$675.
BODY—Wood.
SEATING CAPACITY—Four persons.
FRAME—Angle steel.
BRAKES—Double acting hub.
TIRES—26 x 3.
CYLINDERS—1, horizontal.
COOLING—Water, positive gear pump.

IGNITION—Jump spark, dry batteries.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary (no internal gears).
SPEEDS—2 forward and reverse.
DRIVE—Direct, single chain.
WHEEL BASE—76 inches.
TREAD—55 inches.
WEIGHT—975 pounds.



Wolverine. Model K. — Wolverine Automobile & Commercial Vehicle Co., Dundee, Mich.

PRICE—$750.
BODY—Individual seats; runabout.
SEATING CAPACITY—Two persons.
FRAME—Angle steel.
BRAKES—Internal hub brakes, equalizing device.
TIRES—28 x 3.
CYLINDERS—2, 2-cycle.
COOLING—Water tank, 4 gals., in dash.

IGNITION—Jump spark, single coil in dash.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Shaft bevel gear.
WHEEL BASE—72 inches.
TREAD—56 inches.
WEIGHT—1,000 pounds.



Cadillac. Model K, Runabout, 10 M. P. — Cadillac Motor Car Co., Detroit, Mich.

PRICE—$750.
BODY—Wood, Victoria type.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—Double acting on differential.
TIRES—28 x 3.
CYLINDERS—1, under body.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Cotter pin chain.
WHEEL BASE—74 inches.
TREAD—56 inches.
WEIGHT—1,100 pounds.



Pierce. Racine Model A-3, 12 M. P. — Pierce Engine Co., Racine Junction, Wis.

PRICE—$750.
BODY—Runabout.
SEATING CAPACITY—Two persons.
TIRES—28 x 3.
CYLINDERS—Twin cylinder in front under hood.
COOLING—Long radiator.

DRIVE—Chain.
WHEEL BASE—89 inches.
TREAD—56 inches.



Maxwell. Model L, Runabout, 10 M. P. — Maxwell-Briscoe Motor Co., Tarrytown, N. Y.

PRICE—$780.
BODY—Steel.
SEATING CAPACITY—2 persons.
FRAME—Pressed steel.
BRAKES—Hub and drum on transmission.
TIRES—28 x 3.
CYLINDERS—2, double opposed.
COOLING—Thermo-siphon.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—76 inches.
TREAD—56 inches.
WEIGHT—1,000 pounds.

Stoddard-Dayton. Model E, 15-18 M. P. — Dayton Motor Car Co., Dayton, O.

BODY—Wood, single seat.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—On transmission, expanding on rear wheels.
TIRES—30 x 3.
CYLINDERS—4, twin.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Selective.
SPEEDS—3 ahead and reverse.
DRIVE—Shaft.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—1,200 pounds.

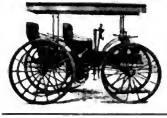
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Wayne. Model H, 14 M. P. Wayne Automobile Co., Detroit, Mich.

PRICE—$800.
BODY—Semi-racer, runabout type.
SEATING CAPACITY—Two persons.
FRAME—Angle iron.
BRAKES—2 hub brakes.
TIRES—28 x 3.
CYLINDERS—2, opposed, crosswise under hood.
COOLING—Water, tube radiator.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—82 inches.
TREAD—56 inches.
WEIGHT—975 pounds.



Holsman. Model No. 6, 10 M.P. Holsman Automobile Co., Chicago, Ill.

PRICE—$800.
BODY—Surrey.
SEATING CAPACITY—Four persons.
FRAME—Tubular.
BRAKES—Rim.
TIRES—1 ½ Inches.
CYLINDERS—2, horizontal-opposed.
COOLING—Air.

IGNITION—Jump spark.
TRANSMISSION—Steel cubic.
DRIVE—Direct.
WHEEL BASE—66 inches.
TREAD—56 to 62 inches.
WEIGHT—900 pounds.



Logan. Model F, 10 M. P. Logan Construction Co., Chillicothe, O.

PRICE $900.
BODY—Wood, divided seats.
SEATING CAPACITY—2 persons.
FRAME—Angle steel.
BRAKES—2, hand contracting.
TIRES—28 x 3.
CYLINDERS—2 opposed, across front.
COOLING—Air, with fan.

IGNITION—Jump spark, dry cells.
CLUTCH—Band contracting.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—90 inches.
TREAD—54 inches.
WEIGHT—900 pounds.



Lambert. Model A, 16 M. P. Buckeye Mfg. Co., Anderson, Ind.

PRICE—$900.
BODY—Wood.
SEATING CAPACITY—Two persons.
FRAME—Angle iron.
BRAKES—Differential, expansion in hubs.
TIRES—30 x 3½.
CYLINDERS—2, opposed.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Friction drive.
SPEEDS—Any desired.
DRIVE—Double chain.
WHEEL BASE—78 inches.
TREAD—56 inches.
WEIGHT—1,000 pounds.

Pierce. Model Stanhope, 8 M. P. George N. Pierce Co., Buffalo, N. Y.

PRICE—$900, without top.
BODY—Stanhope, wood.
SEATING CAPACITY—Four persons.
FRAME—Tubular steel.
BRAKES—On rear wheel hubs.
TIRES—30 x 3.
CYLINDERS—1, 3 15-16 x 4 15-16.
COOLING—Water, tubular disc radiator.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
WHEEL BASE—70 inches.
TREAD—54 inches.
WEIGHT—1,250 pounds.

Model. Model Runabout, 16-18 M.P. Model Gas Engine Works, Auburn, Ind.

PRICE—$900; tonneau extra, $50.
BODY—Runabout.
SEATING CAPACITY—Two persons.
BRAKES—On differential, through transmission.
TIRES—30 x 3.
CYLINDERS—Double-opposed, 5 x 5.
COOLING—Water, gear pump.

TRANSMISSION—Planetary or sliding gear.
SPEEDS—2 forward and reverse, 3-speed extra.
DRIVE—Roller chain.
WHEEL BASE—72 inches; 86-inch extra.
TREAD—56 inches.
WEIGHT—1,300 pounds.

Cadillac. Model M, 10 M. P. Cadillac Motor Car Co., Detroit, Mich.

PRICE—$950.
BODY—Wood, Victoria type, double side entrance.
SEATING CAPACITY—Four persons.
FRAME—Pressed steel.
BRAKES—Double acting on differential.
TIRES—30 x 3½.
CYLINDERS—1, under body.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Cotter pin chain.
WHEEL BASE—76 inches.
TREAD—56 inches.
WEIGHT—1,350 pounds.

Moline. Model G, 16 M. P. Moline Automobile Co., East Moline, Ill.

PRICE—$1,000.
BODY—Side entrance, detachable tonneau.
SEATING CAPACITY—Four persons.
FRAME—Channel section pressed steel.
BRAKES—Raymond.
TIRES—30 x 3½.
CYLINDERS—2 horizontal-opposed.
COOLING—Water cooled, pump connected direct.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 and reverse.
DRIVE—Whitney roller chain.
WHEEL BASE—86 inches.
TREAD—56 ¼ inches.
WEIGHT—1,100 pounds.

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Ford. Model F.

Ford Motor Company, Detroit, Mich.

PRICE—$1,000.
BODY—Tonneau, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—Internal rear wheel.
TIRES—3½ x 30.
CYLINDERS—2, horizontal opposed.
COOLING—Water.

IGNITION—Jump spark batteries.
CLUTCH—Disc.
TRANSMISSION—Planetary
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—1,400 pounds.



Autocar. Type X, 12-14 M. P.

Autocar Company, Ardmore, Pa.

PRICE—$1,000.
BODY—Runabout.
SEATING CAPACITY—2 persons.
FRAME—Armored wood.
BRAKES—External hub, on rear wheels; pinion shaft.
TIRES—28 x 3.
CYLINDERS—2, horizontal-opposed in front.
COOLING—Water, tubular radiator, centrifugal pump.

IGNITION—Jump spark.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—76 inches.
TREAD—54 inches.
WEIGHT—1,340 pounds.



Mitchell. Model C 4, Runabout, 14-18 M. P.

Mitchell Motor Car Co., Racine Junction, Wis.

PRICE—$1,000.
BODY—Runabout.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—Foot and hand emergency.
TIRES—30 x 3½ inches.
CYLINDERS—4, vertical, 3½ x 4.
COOLING—Cellular radiator with fan.

IGNITION—Jump spark.
CLUTCH—Cone friction.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward, 1 reverse.
DRIVE—Bevel gear, shaft drive.
WHEEL BASE—86 inches.
TREAD—56 inches.
WEIGHT—1,200 pounds.

Buick. 22 M. P.

Buick Motor Co., Jackson, Mich.

PRICE—$1,000.
BODY—Runabout.
SEATING CAPACITY—Two persons
FRAME—Angle iron.
BRAKES—Hub.
TIRES—30 x 3½.
CYLINDERS—2, double-opposed.
COOLING—Water

IGNITION—Jump spark.
TRANSMISSION—Spur gear, cone clutch on high speed.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—86 inches.
TREAD—56 inches
WEIGHT—1,200 pounds.

Cadillac. Model M, 10 M. P.

Cadillac Motor Car Co., Detroit, Mich.

PRICE—$1,000.
BODY—Wood, folding tonneau.
SEATING CAPACITY—Four persons.
FRAME—Pressed steel.
BRAKES—Double acting on differential.
TIRES—30 x 3½.
CYLINDERS—1, under body.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse
DRIVE—Cotter pin chain.
WHEEL BASE—76 inches.
TREAD—56 inches.
WEIGHT—1,350 pounds.

Zent. Model Runabout, 14 M.P.

Zent Automobile Co., Bellefontaine, O.

PRICE—$1,000.
BODY—Wood.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—Internal hub.
TIRES—28 x 3.
CYLINDERS—2, opposed, horizontal.
COOLING—Air, copper tube radiation.

IGNITION—Jump spark and latest coil.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—80 inches.
TREAD—56 inches.
WEIGHT—900 pounds.



Lambert. Model 4, 16 M. P.

Buckeye Mfg. Co., Anderson, Ind.

PRICE—$1,050.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—On differential, expansion in hubs
TIRES—30 x 3½.
CYLINDERS—2, opposed, 6 x 4.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—
TRANSMISSION—Friction drive.
SPEEDS—Any speed desired.
DRIVE—Double chain.
WHEEL BASE—94 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Model. 24 M. P.

Model Gas Engine Works, Auburn, Ind.

PRICE—$1,050.
BODY—Rear entrance, divided front seats.
SEATING CAPACITY—Five persons.
BRAKES—Differential and transmission.
TIRES—32 x 3½, or 34 x 3½.
CYLINDERS—Double-opposed, 5 x 7.
COOLING—Water, gear pump.

TRANSMISSION—Planetary, sliding gear, extra.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—78 inches, extra 86 inch.
TREAD—56 inches.
WEIGHT—1,600 pounds.

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Queen, Model E, 18 M. P. — C. H. Blomstrom Motor Co., Detroit, Mich.

PRICE $1,100.
BODY—Side entrance, detachable.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—Foot lever on differential.
TIRES—30 x 3 and 30 x 3½.
CYLINDERS—Two horizontal opposed.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Chain.
WHEEL BASE—86 inches.
TREAD—56 inches.
WEIGHT—1,600 pounds.

Model. 16-18 M. P. — Model Gas Engine Works, Auburn, Ind.

PRICE—$1,150.
BODY—Side entrance, divided front seats.
SEATING CAPACITY—Five persons.
BRAKES—Differential and transmission.
TIRES—32 x 3½.
CYLINDERS—Double opposed, 5 x 5.
COOLING—Water, gear pump.

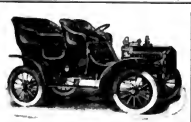
TRANSMISSION—Planetary, or 3 speed forward sliding gear.
SPEEDS—2, forward and reverse.
DRIVE—Roller chain.
WHEEL BASE—86 inches.
TREAD—56 inches.
WEIGHT—1,400 pounds.



Pierce Racine, Model B-3, 18 M. P. — Pierce Engine Co., Racine Junction, Wis.

PRICE—$1,150.
BODY—Touring.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
TIRES—30 x 3½.

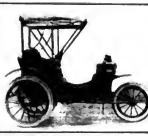
CYLINDERS—4, mounted in front under hood.
COOLING—Long radiator.
DRIVE—Chain.
WHEEL BASE—95 inches.
TREAD—56 inches.



Michigan, Model E, 16 M. P. — Michigan Automobile Co., Ltd., Kalamazoo, Mich.

PRICE—$1,200.
BODY—Wood; extra wide rear seat.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—Primary, band brake around differential, expanding rear hub.
TIRES—30 x 3½.
CYLINDERS—2 horizontal.
COOLING—Water.

IGNITION—Jump spark with double coil.
CLUTCH—Bronze and iron plates.
TRANSMISSION—Planetary brake bands, fibre lined.
SPEEDS—2, forward and reverse.
DRIVE—Chain.
WHEEL BASE—86 inches.
TREAD—55 inches.
WEIGHT—1,800 pounds.



Duryea, 3-wheeled Phaeton, 12-15 M. P. — Duryea Power Co., Reading, Pa.

PRICE—$1,200.
BODY—Wood, curved line.
SEATING CAPACITY—2 adults, 2 children.
FRAME—Armored bent wood.
BRAKES—Internal expanding rear axle, low clutch transmission brake.
TIRES—Front, 30 x 3; rear, 36 x 3.
CYLINDERS—3, across body, under seat, inclined.
COOLING—Water, thermo circulation.

IGNITION—Make and break magneto, low tension.
CLUTCH—Double cone, bronze and steel.
TRANSMISSION—Duryea planetary.
SPEEDS—2, forward and reverse.
DRIVE—Single chain near one side.
WHEEL BASE—81 inches.
TREAD—56 inches.
WEIGHT—950 pounds.



Lambert, Model 5, 16 M. P. — Buckeye Mfg. Co., Anderson, Ind.

PRICE—$1,200.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAMES—Angle iron.
BRAKES—On differential, expansion in hubs.
TIRES—30 x 3½.
CYLINDERS—2, opposed, 6 x 4.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Friction drive.
SPEEDS—Any speed desired.
DRIVE—Double chain.
WHEEL BASE—94 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Rambler, Model Surrey Type 1, 18 M. P. — Thomas B. Jeffery & Co., Kenosha, Wis.

PRICE—$1,200.
BODY—Double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission gear, expanding in rear wheels.
TIRES—30 x 3½.
CYLINDERS—2, horizontal opposed.
COOLING—Water, thermo-siphon system.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Single chain.
WHEEL BASE—90 inches.
TREAD—56½ inches.

Cadillac, Model M Coupe, 10 M. P. — Cadillac MotorCar Co., Detroit, Mich.

PRICE—$1,200.
BODY—Wood.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—Double acting on differential.
TIRES—30 x 3½.
CYLINDERS—1 under body.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Cotter pin chain.
WHEEL BASE—76 inches.
TREAD—56 inches.

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CARS COSTING FROM $1,250 TO $1,300

Pierce Racine. Model D, 18 M. P. Pierce Engine Co., Racine, Wis.

PRICE—$1,250.
BODY—Side opening tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—3.
TIRES—30 x 3.
CYLINDERS—4 vertical front.
IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3.
DRIVE—Chain.
WHEEL BASE—94 inches.
TREAD—54 inches
WEIGHT—1,600 pounds

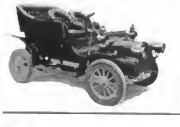
Oldsmobile. Model L, 24 M. P. Olds Motor Works, Lansing, Mich.

PRICE—$1,250.
BODY—Wood, reversible rear seats, luggage compartment.
SEATING CAPACITY—Four persons.
FRAME—Compressed steel, channel sections.
BRAKES—Cardan shaft and rear hubs.
TIRES—30 x 3½.
CYLINDERS—2, vertical, two-stroke cycle.
COOLING—Water, gear pump and blast tube radiator.
IGNITION—Jump spark, with dry or storage cell.
CLUTCH—Flywheel cone.
TRANSMISSION—Selective sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Direct bevel gear.
WHEEL BASE—102 inches.
TREAD—55 inches.
WEIGHT—1,700 pounds.



Maxwell. Model N, "Doctor" 16-20 M. P. Maxwell-Briscoe Co. Tarrytown, N. Y.

PRICE—$1,250; with top, $1,325.
BODY—Metal, with stamped ornamental heads
SEATING CAPACITY—Two persons
FRAME—Pressed steel.
BRAKES—2, on hubs and transmission shaft.
TIRES—30 x 3½.
CYLINDERS—2 in. double opposed.
COOLING—Honeycomb cooler, thermosiphon
IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—85 inches
TREAD—56 inches.
WEIGHT—1,600 pounds



Glide. Model F, 16-18 M. P. Bartholomew Co., Peoria, Ill.

PRICE—$1,250.
BODY—Side entrance, tonneau detachable.
SEATING CAPACITY—Four persons.
FRAME—Armored wood, 3 point suspension.
BRAKES—On differential gear and on transmission.
TIRES—30 x 3½.
CYLINDERS—Horizontal double-opposed
COOLING—Radiator with circulating pump.
IGNITION—Jump spark.
CLUTCH—Friction shoes.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Heavy roller, single chain.
WHEEL BASE—80 inches.
TREAD—54 inches.
WEIGHT—1,600 pounds.



Auburn. Model C, 20 M. P. Auburn Automobile Co., Auburn, Ind.

PRICE—$1,250.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—3.
TIRES—30 x 3½.
CYLINDERS—2, under body.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Friction.
TRANSMISSION—Planetary.
SPEEDS—2 and reverse.
DRIVE—Chain.
WHEEL BASE—94 inches.
TREAD—56 inches.
WEIGHT—1,750 pounds.

Jackson. Model C, 20-24 M. P. Jackson Automobile Co., Jackson, Mich.

PRICE—$1,750.
BODY—King of the Belgians, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Channel steel.
BRAKES—Raymond brake, on differential.
TIRES—30 x 3½.
CYLINDERS—2, horizontal-opposed under body, 5¼ x5.
COOLING—Water.
IGNITION—Jump spark and storage battery.
CLUTCH—Cone.
TRANSMISSION—Jackson planetary.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—1,750 pounds.



Wayne. Model C, 20 M. P. Wayne Automobile Co., Detroit, Mich.

PRICE—$1,250.
BODY—Touring, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Hub external.
TIRES—30 x 3½.
CYLINDERS—2, lengthwise under front seat.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse
DRIVE—Chain.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—1,600 pounds.



Reo. Model A, 16 M. P. Reo Motor Car Co., Lansing, Mich.

PRICE—$1,250.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On sprocket, on rear wheels.
TIRES—30 x 3½.
CYLINDERS—2, horizontally opposed.
COOLING—Water, positive gear pump.
IGNITION—Jump spark, dry batteries
batteries.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary (no internal gears).
SPEEDS—2 forward and reverse.
DRIVE—Direct single chain.
WHEEL BASE—90 inches.
TREAD—55 inches.
WEIGHT—1,600 pounds.

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Dolson. Model C, 20 M. P. — Dolson Automobile Co., Charlotte, Mich.

PRICE—$1,250.
BODY—Detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—"T" steel trussed.
BRAKES—2 on differential.
TIRES—30 x 3½.
CYLINDERS—2, horizontal.
COOLING—Water.
IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Gale. Model E, 18 M. P. — Western Tool Works, Galesburg, Ill.

PRICE—$1,250.
BODY—Side entrance, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Angle and channel steel.
BRAKES—2 external hubs, 1 transmission.
TIRES—30 x 3½ inches.
CYLINDERS—Horizontal, double opposed, 5 x 5.
COOLING—Water, direct driven pump.
IGNITION—Jump spark, 2 sets dry cells.
CLUTCH—Cone, metal to metal.
TRANSMISSION—3 pinion spur gear, tight case.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—92 inches.
TREAD—56 inches.
WEIGHT—1,700 pounds.

Model. 24 M. P. — Model Gas Engine Works, Auburn, Ind.

PRICE—$1,250.
BODY—Side entrance, divided front seats.
SEATING CAPACITY—Five passengers.
BRAKES—On differential and through transmission.
TIRES—32 x 3½ or 34 x 3½.
CYLINDERS—Double-opposed, 5 x 7.
COOLING—Water, gear pump.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse, extra for 3 forward.
DRIVE—Roller chain.
WHEEL BASE—92 inches.
WEIGHT—1,600 pounds.



Buick. Model F, 22 M. P. — Buick Motor Co., Jackson, Mich.

PRICE—$1,250.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—Hub.
TIRES—30 x 3½.
CYLINDERS—Double-opposed.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Cone clutch on high speed.
TRANSMISSION—Spur gear.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—87 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.

Stevens-Duryea. Model L. 7 M. P. — J. Stevens Arms & Tool Co. Chicopee Falls, Mass.

PRICE—$1,300 with top.
BODY—Wood, Stanhope folding front seat.
SEATING CAPACITY—Four persons.
FRAME—Wood, power plant mounted in body.
BRAKES—Expanding on rear hubs and on differential.
TIRES—28 x 3 x 3½.
CYLINDERS—2 horizontal.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Individual clutch.
SPEEDS—3 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—69 inches.
TREAD—54 inches.
WEIGHT—1,250 pounds.



Duryea. Model Doctor's Phaeton 12.15 M. P. — Duryea Power Co., Reading, Pa.

PRICE—$1,300.
BODY—Wood, curved line.
SEATING CAPACITY—Two adults and two children.
FRAME—Armored heat wood.
BRAKES—Internal expanding on rear axle, low clutch transmission.
TIRES—Front, 30 x 3; rear, 36 x 3.
CYLINDERS—2, across body under seat, inclined.
COOLING—Water, pump and thermo-siphon.
IGNITION—Make and brake magneto, low tension.
CLUTCH—Double cone, bronze and steel.
TRANSMISSION—Duryea planetary.
SPEEDS—2 forward and reverse.
DRIVE—Single side chain.
WHEEL BASE—78 inches.
TREAD—56 inches.
WEIGHT—1,050 pounds.

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CARS COSTING FROM $1,350 TO $1,450



Rambler. Model Surrey Type 3, 20 M. P.

Thomas B. Jeffery & Co., Kenosha, Wis.

PRICE—$1,350.
BODY—Double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission gear, in rear wheels.
TIRES—30 x 4.
CYLINDERS—2, horizontal-opposed.
COOLING—Water, thermo-siphon system.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Planetary type.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—100 inches.
TREAD—56½ inches.

Gale. Model F, 18 M. P.

Western Tool Works, Galesburg, Ill.

PRICE—$1,350 (with Cape cart top).
BODY—Side entrance, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Angle and channel steel.
BRAKES—2 external hub, 1 emergency transmission.
TIRES—30 x 3½ inches.
CYLINDERS—Horizontal, double opposed, 5 x 5.
COOLING—Water, direct-driven pump.

IGNITION—Jump spark, 2 sets dry cells.
CLUTCH—Cone, metal to metal.
TRANSMISSION—3 pinion spur gear, light case.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—92 inches.
TREAD—56 inches.
WEIGHT—1,700 pounds.

Franklin. Model E, 12 M. P.

H. H. Franklin Mfg. Co., Syracuse, N. Y.

PRICE—$1,400.
BODY—Stanhope.
SEATING CAPACITY—Two persons.
FRAME—Wood.
BRAKES—2 equalizing bands on rear wheels.
TIRES—28 x 3.
CYLINDERS—4 vertical, under hood.
COOLING—Air.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—81 inches.
TREAD—56 inches.
WEIGHT—1,100 pounds.

Stanhope. Model C, 15 M. P.

Twyford Motor Car Co., Brookville, Pa.

PRICE—$1,400.
BODY—Wood.
SEATING CAPACITY—Four persons.
FRAME—Steel.
BRAKES—3.
TIRES—30 x 3½.
CYLINDERS—2, upright.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Not sliding.
DRIVE—Shaft.
WHEEL BASE—70 inches.
TREAD—56 inches.
WEIGHT—1,300 pounds.



Compound. Model Doctor's Stanhope, 12-15 M. P.

E. H. V. Company, Middletown, Conn.

PRICE—$1,400.
BODY—Aluminum, Stanhope.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—On driving shaft, 2 internal expanding hub.
TIRES—28 x 3.
CYLINDERS—3, vertical under bonnet.
COOLING—Water by positive gear pump.
IGNITION—Jump spark.

CLUTCH—Inverted leather lined cone.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Double chain or shaft.
WHEEL BASE—82 inches.
TREAD—56½ inches.
WEIGHT—1,400 pounds.



Knox. Model F 4, Tourist, 14-16 M. P.

Knox Automobile Company, Springfield, Mass.

PRICE—$1,400.
BODY—Wood and sheet metal.
SEATING CAPACITY—Two persons.
FRAME—Angle iron.
BRAKES—On motor, on rear axle.
TIRES—30 x 3½.
CYLINDERS—2, horizontal.
COOLING—Air.

IGNITION—Jump spark and dry cells.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—1,600 pounds.



Compound. Model 4, 12-15 M. P.

E. H. V. Company, Middletown, Conn.

PRICE—$1,400.
BODY—Aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On driving shaft, 2 internal expanding hub.
TIRES—28 x 3½.
CYLINDERS—3, vertical, under bonnet.
COOLING—Water by positive gear pump.

IGNITION—Jump spark.
CLUTCH—Inverted leather lined cone.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Double chain or shaft.
WHEEL BASE—82 inches.
TREAD—56½ inches.
WEIGHT—1,650 pounds.



Maxwell. Model H, 16 M. P.

Maxwell-Briscoe Motor Co., Tarrytown, N. Y.

PRICE—$1,450.
BODY—Steel, touring.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Hub and drum on transmission.
TIRES 30 x 3½.
CYLINDERS—2, double opposed.
COOLING—Thermo-siphon.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—85 inches.
TREAD—56 inches.
WEIGHT—1,600 pounds.

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Dolson. Model D, 20 M. P. Dolson Automobile Co., Charlotte, Mich.

PRICE—$1,500.
BODY—Wood frame, steel panels.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Double int
TIRES—30 x 3½.
CYLINDERS—2 opposed under hood.
COOLING—Water.

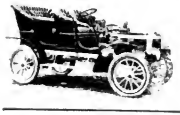
IGNITION—2 sets of dry cells.
CLUTCH—Cone.
TRANSMISSION—Sliding pinion.
SPEEDS—2 and reverse.
DRIVE—Shaft and bevel gears.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—1,700 pounds.



Marion. Model 2, 16 M.P. Marion Motor Car Co., Indianapolis, Ind.

PRICE—$1,500.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Wood armored
BRAKES—Two.
TIRES—30 x 3½.
CYLINDERS—4, transverse.
COOLING—Air.

IGNITION—Jump spark, 4 unit oil, dry batteries.
CLUTCH—Cone.
TRANSMISSION—Planetary
SPEEDS—2, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—96 inches.
TREAD—56½ inches.
WEIGHT—1,750 pounds.



Jackson. Model D, 20-24 M.P. Jackson Automobile Co., Jackson, Mich.

PRICE $1,500.
BODY—King of the Belgians, wood with detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Hub and propeller shaft.
TIRES—32 x 3½.
CYLINDERS—2, crossways under the hood.
COOLING—Water.

IGNITION—Jump spark and storage battery, coil on dash.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Bevel.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Premier. Model F, 16 M. P. Premier Motor Mfg. Co., Indianapolis, Ind.

PRICE—$1,500.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—Differential.
TIRES—32 x 3½.
CYLINDERS—4, vertical transverse.
COOLING—Direct radiation (air cooled).

IGNITION—Jump spark from storage battery.
CLUTCH—Cone.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Chain.
WHEEL BASE—96 inches.
TREAD—56½ inches.
WEIGHT—1,900 pounds.



Duryea. Model, 12-15 M.P. Duryea Power Co., Reading, Pa.

PRICE—$1,500.
BODY—Wood, curved line.
SEATING CAPACITY—Four adults, two children.
FRAME—Armored bent wood.
BRAKES—Internal expanding rear axle, low clutch transmission.
TIRES—Front, 30 x 3; rear, 36 x 3½.
CYLINDERS—3, across body under seat, inclined.
COOLING—Water, pump and siphon.

IGNITION—Make and break with magneto, low tension.
CLUTCH—Double cone, bronze and steel.
TRANSMISSION—Duryea planetary.
SPEEDS—2, forward and reverse.
DRIVE—Single chain near one side.
WHEEL BASE—78 inches.
TREAD—56 inches.
WEIGHT—1,150 pounds.

Lambert. Model 6. 18 M. P. Buckeye Mfg. Co., Anderson, Ind.

PRICE—$1,500.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—Differential, expansion in hubs.
TIRES—30 x 3½.
CYLINDERS—2, opposed.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Friction drive.
SPEEDS—Any speed desired.
DRIVE—Double chain.
WHEEL BASE—94 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Knox. Model F, 1, Runabout, 14-16 M. P. Knox Automobile Company Springfield, Mass.

PRICE—$1,500.
BODY—Wood and sheet metal, folding front seat.
SEATING CAPACITY—Two or four persons.
FRAME—Angle iron.
BRAKES—1 on motor, 1 on rear axle.
TIRES—30 x 4.
CYLINDERS—2 horizontal.
COOLING—Air.

IGNITION—Jump spark and dry cells.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Single chain, 1¼ inches.
WHEEL BASE—81 inches.
TREAD—56 inches.
WEIGHT—1,850 pounds.



Oxford. 16 M. P. Detroit-Oxford Mfg. Co., Oxford, Mich.

PRICE—$1,500.
BODY—Surrey or side door.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal, expanding in hubs.
TIRES—30 x 3½.
CYLINDERS—2, horizontal-opposed, 5 x 4½.
COOLING—Water, thermo siphon.

IGNITION—Jump spark.
CLUTCH—Individual clutch.
TRANSMISSION—Direct drive.
SPEEDS—2, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—1,500 pounds.

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Elmore. Model 14, 24 M. P. — Elmore Mfg. Co., Clyde, O.

BODY—Detachable tonneau, turtle deck.
SEATING CAPACITY—
FRAME—Pressed, cold rolled steel.
BRAKES—2 internal band on rear wheels, 1 external on propeller shaft.
TIRES—32 x 3½ inches.
CYLINDERS—2-cycle, vertical, 5 x 5, fore and aft.
COOLING—Water tank and radiator combined.

IGNITION—Self-starting, roller contact.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
WHEEL BASE—92 inches.
TREAD—56 inches.
WEIGHT—1,750 pounds.

Orient. Model K, 16 M. P. — Waltham Manufacturing Co., Waltham, Mass.

PRICE—$1,000.
BODY—Wood.
SEATING CAPACITY—2 persons.
FRAME—Pressed steel with sub frame.
BRAKES—Transmission, hub bands.
TIRES—30 x 3½.
CYLINDERS—4, parallel with frame in front.
COOLING—Air.

IGNITION—Jump spark, storage battery.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—82 inches.
TREAD—54 inches.
WEIGHT—1,300 pounds.

Pope-Hartford. Model G. 8 M. P. — Pope Manufacturing Co. Hartford, Conn.

PRICE—$1,000.
BODY—Side entrance, tonneau.
SEATING CAPACITY—Five persons.
FRAME—Oak armored with steel plates.
BRAKES—External band on transmission, internal bands on rear wheels.
TIRES—30 x 3½.
CYLINDERS—2, horizontal-opposed, crosswise.
COOLING—Water.

IGNITION—Jump spark, 2 sets dry cells.
CLUTCH—Internal cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3, ahead and reverse.
DRIVE—Shaft.
WHEEL BASE—88 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.

Rambler, Model Surrey Type 2, 20 M. P. — Thomas B. Jeffery & Co., Kenosha, Wis.

PRICE—$1,650.
BODY—Double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission, expanding in rear wheels.
TIRES—32 x 4.
CYLINDERS—2, horizontal opposed.
COOLING—Water, thermo-siphon system.

IGNITION—Jump spark, automatically controlled.
CLUTCH—Cone.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Individual chain to each rear wheel.
WHEEL BASE—100 inches.
TREAD—56½ inches.

Cannon. Model No. 3. — Burt Manufacturing Co., Kalamazoo, Mich.

PRICE—$1,650.
BODY—Side entrance.
SEATING CAPACITY—Four persons.
FRAME—Angle steel.
BRAKES—On countershaft.
TIRES—32 x 3½ pneumatics, or 40 x 3, solid.
CYLINDERS—5 x 4, horizontal-opposed in front.
COOLING—Water, thermo-siphon.

IGNITION—Jump spark, dry cells.
CLUTCH—None.
TRANSMISSION—Friction.
SPEEDS—3, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—104 inches.
TREAD—56 inches.
WEIGHT—1,600 pounds.

Columbia. Mark XLIV-2. 18-19 M. P. — Electric Vehicle Co., Hartford, Conn.

PRICE—$1,750.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Expanding and contracting on rear wheel drums.
TIRES—32 x 3½.
CYLINDERS—2 horizontal opposed.
COOLING—Water, cellular radiator.

IGNITION—Jump spark, 20 cells, 5 groups, 4 cells each.
CLUTCH—Flywheel cone, leather faced.
TRANSMISSION—Sliding gear selective.
SPEEDS—3 ahead, one reverse.
DRIVE—Bevel gear propeller shaft.
WHEEL BASE—90 inches.
TREAD—55 inches.
WEIGHT—1,800 pounds.



Pierce Racine. Model C. 24 M. P. — Pierce Engine Co., Racine Junction, Wis.

PRICE—$1,750.
BODY—Side-opening tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—3.
TIRES—30 x 3½.
CYLINDERS—4, vertical, front.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Duryea Model Touring, 25 M. P. — Duryea Power Co., Reading, Pa.

BODY—Wood, curved line.
SEATING CAPACITY—Five adults, two children.
FRAME—Armored bent wood.
BRAKES—Internal expanding rear axle, low clutch transmission.
TIRES—Front, 30 x 3; rear, 36 x 3½.
CYLINDERS—3, across body under seat, inclined.
COOLING—Water, pump and thermo-siphon.

IGNITION—Make and break magneto, low tension.
CLUTCH—Double cone, bronze and steel.
TRANSMISSION—Duryea planetary.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—96 inches.
TREAD—56 inches.
WEIGHT—1,400 pounds.

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Moline. Model C, 20-22 M. P. Moline Automobile Co., East Moline, Ill.

PRICE—$1,750.
BODY—Double side entrance, King of Belgium.
SEATING CAPACITY—Five persons.
FRAME—Channel section, pressed steel.
BRAKES—2 pairs of hub brakes, internal and external.
TIRES—32 x 2½.
CYLINDERS—4 vertical, cast in pairs.

IGNITION—Jump spark, dry cells and batteries.
CLUTCH—Leather-faced cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—100 inches.
TREAD—56½ inches.
WEIGHT—2,000 pounds.

Rambler. Model 14, 20-25 M. P. Thos. B. Jeffery & Co., Kenosha, Wis.



PRICE—$1,750.
BODY—Double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Differential, expanding on rear wheel.
TIRES—32 x 3½.
CYLINDERS—4, vertical, longitudinal in frame.
COOLING—Water, special radiator, fan.

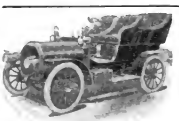
IGNITION—Jump spark, 4 coils, storage battery.
CLUTCH—Cone in flywheel.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Propeller shaft.
WHEEL BASE—106 inches.
TREAD—56½ inches.
WEIGHT—2,250 pounds.

Knox. Model F 3, Surrey 14-16 M. P. Knox Automobile Company, Springfield, Mass.

PRICE—$1,750.
BODY—Wood and sheet metal.
SEATING CAPACITY—Two or four persons.
FRAME—Angle iron.
BRAKES—2 on rear axle.
TIRES—30 x 4.
CYLINDERS—2, horizontal.
COOLING—Air.

IGNITION—Jump spark and dry cells.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Single chain.
WHEEL BASE—87 inches.
TREAD—56 inches.
WEIGHT—1,950 pounds.

Orient. Model L, 16 M. P. Waltham Mfg. Co., Waltham, Mass.



PRICE—$1,750.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel with sub-frame.
TIRES—30 x 3½.
BRAKES—Transmission hub bands.
CYLINDERS—4, parallel with frame in front.
COOLING—Air.

IGNITION—Jump spark storage battery.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—82 inches.
TREAD—56 inches.
WEIGHT—1,450 pounds.

Orient. Model M, 16 M.P. Waltham Manufacturing Co., Waltham, Mass.

PRICE—$1,750.
BODY—Wood.
SEATING CAPACITY—Four persons.
FRAME—Pressed steel with sub-frame.
BRAKES—Transmission, hub bands.
TIRES—30 x 3½.
CYLINDERS—4, parallel with frame in front.
COOLING—Air.

IGNITION—Jump spark, storage battery.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—82 inches.
TREAD—56 inches.
WEIGHT—1,450 pounds.

Franklin. Model G, 12 M.P. H. H. Franklin Mfg. Co., Syracuse, N. Y.



PRICE—$1,800.
BODY—Aluminum, side entrance, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Wood.
BRAKES—1 countershaft and 2 equalizing bands on rear wheels.
TIRES—28 x 3½.
CYLINDERS—4, vertical, under hood.
COOLING—Air.

IGNITION—Jump spark.
CLUTCH—Multiple disc clutch.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—88 inches.
TREAD—56 inches.
WEIGHT—1,900 pounds.

Reo. Model Coupe or Depot Wagon. 16 M. P. Reo Motor Car Co., Lansing, Mich.



PRICE—$1,800.
BODY—Wood, Limousine.
SEATING CAPACITY—Four persons.
FRAME—Pressed steel.
BRAKES—On sprocket, on rear wheels.
TIRES—30 x 3½.
CYLINDERS—2, horizontally opposed.
COOLING—Water, positive gear pump.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary (no internal gears).
SPEEDS—2, forward and reverse.
DRIVE—Direct single chain.
WHEEL BASE—90 inches.
TREAD—55 inches.
WEIGHT—1,800 pounds.

Corbin. Model G, 24 M. P. Corbin Motor Vehicle Corp, New Britain, Conn.



PRICE—$1,800.
BODY—Runabout; divided straight back seat.
SEATING CAPACITY—2 persons.
FRAME—Pressed steel.
BRAKES—Internal and external on rear hub.
TIRES—32 x 3½.
CYLINDERS—4, lengthwise of chassis.
COOLING—Air with fan.

IGNITION—Jump spark.
CLUTCH—Leather faced cone.
TRANSMISSION—Clash-gear, selective system.
SPEEDS—3, forward and reverse.
DRIVE—Shaft drive, floating axle.
WHEEL BASE—100 inches.
TREAD—55 inches.
WEIGHT—1,800 pounds.

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Dolson. Model E, 28-30 M. P. Dolson Automobile Co., Charlotte, Mich.

PRICE—$1,800.
BODY—Surrey type.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—2 on hubs, 1 on transmission.
TIRES—32 x 3½.
CYLINDERS—4, vertical, under bonnet.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—108 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Mitchell. Model D 24-30 M. P. Mitchell Motor Car Co., Racine Junction, Wis.

PRICE—$1,800.
BODY—Touring.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Foot and hand emergency.
TIRES—32 x 4 inches.
CYLINDERS—4, vertical, 4½ x 5.
COOLING—Cellular radiator with fan

IGNITION—Jump spark.
CLUTCH—Cone friction.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear, shaft drive.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Northern. Model C, 20 M. P. Northern Manufacturing Co., Detroit, Mich.

PRICE—$1,800.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Steel.
BRAKES—External hub with lined band.
TIRES—30 x 4.
CYLINDERS—2, double-opposed, set crosswise.
COOLING—Water.

IGNITION—Batteries, jump spark.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Direct shaft, bevel gear.
WHEEL BASE—104 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Pungs-Finch. Model F, 22 M. P. Pungs-Finch Auto and Gas Engine Co. Detroit, Mich.

PRICE—$1,850.
BODY—Side door.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission shaft, on rear wheels.
TIRES—32 x 3½.
CYLINDERS—4, vertical, tandem, front.
COOLING—Water, gear pump.

IGNITION—Jump spark.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—108 inches.
TREAD—56 inches.
WEIGHT—1,850 pounds.



Knox. Model F, 14-16 M. P. Knox Automobile Company, Springfield, Mass.

PRICE—$1,900.
BODY—Wood and sheet metal.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—1 on motor and on rear axle.
TIRES—30 x 4.
CYLINDERS—2, horizontal.
COOLING—Air.

IGNITION—Jump spark and dry cells.
CLUTCH—
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Single chain, 1¼ inches.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Queen. Model K, 28 M.P. C. H. Blomstrom Motor Co., Detroit, Mich.

PRICE—$2,000.
BODY—Side door, divided front seats
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Hub.
TIRES—32 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Toggle joint.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Logan. Model H, 30 M. P. Logan Construction Co., Chillicothe, O.

PRICE—$2,000.
BODY—Side entrance, wood.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—3, band contracting.
TIRES—32 x 4.
CYLINDER—2, opposed.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Hand contracting.
TRANSMISSION—Sliding gear.
SPEEDS—2, forward and reverse.
DRIVE—Chain.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,155 pounds



York. Model C, 24-28 M. P. York Automobile Co., York, Pa.

PRICE—$2,000.
BODY—Tonneau, wood.
SEATING CAPACITY—Five persons.
FRAME—Armored wood, angle inside, band iron outside.
BRAKES—Internal expansion on hubs on propeller shaft.
TIRES—32 x 3½.
CYLINDERS—4, vertical.
COOLING—Water, radiator.

IGNITION—Jump spark.
CLUTCH—Expanding ring.
TRANSMISSION—Sliding.
SPEEDS—3, forward and reverse
DRIVE—Shaft to bevel gear.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—1,975 pounds.

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Corbin. Model E. 24 M. P.

PRICE—$2,000.
BODY—Side entrance, tonneau, divided front seat.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal and external on rear hub.
TIRES—32 x 2½.
CYLINDERS—4, lengthwise of chassis.
COOLING—Air.

Corbin Motor Vehicle Corp., New Britain, Conn.

IGNITION—Jump spark.
CLUTCH—Leather-faced cone.
TRANSMISSION—Clash gear, selective system.
SPEEDS—3, forward and reverse.
DRIVE—Shaft drive, floating axle.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Lambert. Model 7, 34 M. P.

PRICE—$2,000.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAMES—Angle iron.
BRAKES—On differential, expansion in hub.
TIRES—32 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

Buckeye Mfg. Co., Anderson, Ind.

IGNITION—Jump spark.
TRANSMISSION—Friction drive.
SPEEDS—Variable, forward or reverse.
DRIVE—Double chain.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Orient. Model N, 20 M. P. Waltham Manufacturing Co., Waltham, Mass.

PRICE—$2,000.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel with sub frame.
BRAKES—Transmission, hub bands.
TIRES—32 x 3½.
CYLINDERS—4, parallel, with frame in front.
COOLING—Air.

IGNITION—Jump spark, storage battery.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—96 inches.
TREAD—56 inches.
WEIGHT—1,700 pounds.



Zent. Model Touring, 35 M. P.

PRICE—$2,000.
BODY—King of Belgium.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal hub.
TIRES—32 x 3½.
CYLINDERS—4, vertical, longitudinal.
COOLING—Air by copper tube radiation.

Zent Automobile Co., Bellefontaine, O.

IGNITION—Jump spark.
TRANSMISSION—Individual cone clutch with positive gears.
SPEEDS—2, forward and reverse.
DRIVE—Shaft drive.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—1,900 pounds.



Crawford. Crawford Automobile Co., Hagerstown, Md.

PRICE—$2,000.
BODY—Tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Rear hub, band on cross shaft.
TIRES—34 x ——.
CYLINDERS—4, upright, separate 4½ x 4½.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Inverted type.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Duquesne. Model. 16-21 M. P.

PRICE—$2,000.
BODY—Double side entrance tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Expanding on rear wheels.
CYLINDERS—4, vertical.
COOLING—Air.

Duquesne Construction Co. Jamestown, N. Y.

IGNITION—Jump spark, dry cells.
TRANSMISSION—Planetary.
SPEEDS—3, and reverse.
DRIVE—Band gears and triangular system.
TREAD—56 inches.
WEIGHT—1,750 pounds.



Berkshire. Model A, 16 M. P.

PRICE—$2,000.
BODY—Wood, touring.
BRAKES—Outside band, internal expansion on rear
FRAME—Pressed steel.
BRAKES—Outside band, internal expansion on rear wheels.
TIRES—3½ inches.
CYLINDERS—4, in line (front to rear).
COOLING—Water.

Berkshire Automobile Co., Pittsfield, Mass.

IGNITION—Jump spark.
CLUTCH—Leather faced.
TRANSMISSION—Sliding shaft.
SPEEDS—3, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Pungs-Finch. Model H. 28-32 M. P.

PRICE—$2,200.
BODY—Side door.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On rear wheels, internal.
TIRES—32 x 4.
CYLINDERS—4, in pairs, vertical, tandem.
COOLING—Water, gear pump.

Pungs-Finch Auto and Gas Engine Co., Detroit, Mich.

IGNITION—Jump spark, storage battery, magneto optional, extra.
TRANSMISSION—Selective type, sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—107 inches.
TREAD—56 inches.
WEIGHT—1,900 pounds.

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St. Louis. Model Type XVI. 30-35 M. P.

St. Louis Motor Car Co., Peoria, Ill.

PRICE—$2,200.
BODY—Wood, side door entrance.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—1 on each rear wheel and 1 on transmission.
TIRES—32 x 4.
CYLINDERS—4, cast in pairs.
COOLING—Flat tube radiator, circulating water.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear, 6 pitch.
SPEEDS—3, forward and reverse.
DRIVE—Direct, bevel gear.
WHEEL BASE—102 inches.
TREAD—56 inches.
WEIGHT—2,170 pounds.



Oldsmobile. Model S, 26-28 M. P.

Olds Motor Works, Lansing, Mich.

PRICE—$2,250.
BODY—Double side door.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel, channel section.
BRAKES—On cardan shaft and rear hubs.
TIRES—32 x 3½ x 4.
CYLINDERS—4 vertical.
COOLING—Water, gear pump and flat tube radiator.

IGNITION—Jump spark, dry or storage cells.
CLUTCH—Flywheel cone.
TRANSMISSION—Selective sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Direct bevel gear.
WHEEL BASE—105 inches.
TREAD—55 inches.
WEIGHT—2,000 pounds.



Premier Model L, 20-24 M. P.

Premier Motor Mfg. Co., Indianapolis, Ind.

PRICE—$2,250.
BODY—Side entrance, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission, internal expanding on rear hubs.
TIRES—32 x 4.
CYLINDERS—4, vertical, tandem.
COOLING—Direct radiation (air cooled).

IGNITION—Jump spark, storage battery.
CLUTCH—Friction plate.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft, bevel.
WHEEL BASE—104 inches.
TREAD—56¼ inches.
WEIGHT—1,900 pounds.

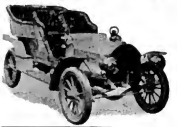


Haynes. Model O, 30-35 M. P.

Haynes Automobile Co., Kokomo, Ind.

PRICE—$2,250.
BODY—Wood and aluminum.
SEATING CAPACITY—Five persons.
FRAME—Channel-pressed steel.
BRAKES—Pedal internal.
TIRES—32 x 4.
CYLINDERS—4, vertical, twin.
COOLING—Water, force pump, radiator and fan.

IGNITION—Jump spark.
CLUTCH—Haynes constricting clutch.
TRANSMISSION—Sliding gears.
SPEEDS—3, forward and reverse.
DRIVE—Propeller shaft and roller gear.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.

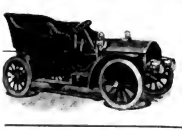


Stoddard-Dayton. Model D, 30-35 M.P.

Dayton Motor Car Co., Dayton, O.

PRICE—$2,250
BODY—Side entrance, Limousine.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission and on rear wheels.
TIRES—32 x 4.
CYLINDERS—4, vertical, separate, 4½ x 5.
COOLING—Water.

IGNITION—Double storage battery, jump spark.
CLUTCH—Leather faced cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft, bevel gears.
WHEEL BASE—102 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Orient. Model R, 20 M.P.

Waltham Manufacturing Co., Waltham, Mass.

PRICE—$2,250.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel with sub frame.
BRAKES—Transmission, hub bands.
TIRES—32 x 3½.
CYLINDERS—4, parallel, with frame in front.
COOLING—Air.

IGNITION—Jump spark, storage battery.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—96 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.

Cadillac. Model H, Runabout, 30 M. P.

Cadillac Motor Car Co., Detroit, Mich.

PRICE—$2,400.
BODY—Wood runabout.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—Double acting, expanding and contracting on rear wheel drums.
TIRES—32 x 4.
CYLINDERS—4, vertical, under hood.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3, forward and reverse.
DRIVE—Direct shaft, bevel gear.
WHEEL BASE—96 inches.
TREAD—56½ inches.
WEIGHT—2,300 pounds.

Harrison. Model B, 35-40 M.P.

Harrison Wagon Co., Grand Rapids, Mich.

BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Double, internal and external on rear hubs.
TIRES—36 x 4½.
CYLINDERS—4, vertical.
COOLING—Tubular radiator.

IGNITION—Storage battery and jump spark.
CLUTCH—Expanding.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—115 inches.
TREAD—54 inches.

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St. Louis. Model Type 16. St. Louis Motor Car Co., Peoria, Ill.

PRICE—$2,500.
BODY—Wood, side door entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—1 on each rear wheel and 1 on transmission.
TIRES—32 x 4.
CYLINDERS—4, cast in pairs.
COOLING—Flat tube radiator, circulating water.
IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear, 6-pitch.
SPEEDS—3, forward and reverse.
DRIVE—Direct, bevel gear.
WHEEL BASE—108 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Stevens-Duryea. Model R. 20 M. P. J. Stevens Arms & Tool Co. Chicopee Falls, Mass.

PRICE—$2,500.
BODY—Side entrance, aluminum; divided front seats.
SEATING CAPACITY—Five persons.
FRAME—Pressed channel steel.
BRAKES—Expanding on rear hubs and constricting at rear gear case.
TIRES—30 x 3½.
CYLINDERS—4, vertical, cast separately.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Propeller shaft.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.

Moline. Model A, 30-35 M. P. Moline Automobile Co., East Moline, Ill.

PRICE—$2,500.
BODY—Double side entrance, King of Belgium.
SEATING CAPACITY—Five persons.
FRAME—Channel section, pressed steel.
BRAKES—Hub brakes, internal and external.
TIRES—34 x 4.
CYLINDERS—4, vertical, cast in pairs.
COOLING—Gear-driven water pump and fan.
IGNITION—Jump spark.
CLUTCH—Leather-faced cone.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—110 inches.
TREAD—56½ inches.
WEIGHT—2,100 pounds.

Winton. Model K, 30 M.P. The Winton Motor Carriage Co., Cleveland, O.



PRICE—$2,500; Limousine, $3,500.
BODY—Touring.
SEATING CAPACITY—Five and six persons.
FRAME—Pressed steel, channel section.
BRAKES—Three band brakes, two on rear hubs, one on longitudinal shaft.
TIRES—34 x 4.
CYLINDERS—4, vertical, 4¾ x 5 in pairs.
COOLING—Water, centrifugal pump.
IGNITION—Jump spark, dry and storage batteries.
TRANSMISSION—Individual clutch.
SPEEDS—Two forward and reverse.
DRIVE—Longitudinal shaft.
WHEEL BASE—102 inches.
TREAD—56½ inches.

Iroquois. Model D, 25-30 M. P. Iroquois Motor Car Co., Seneca Falls, N.Y.



PRICE—$2,500.
BODY—Wood, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Rolled steel, reinforced with angle iron.
BRAKES—On drive shaft, and on hubs.
TIRES—32 x 4.
CYLINDERS—4, vertical, cast in pairs.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Expanding.
TRANSMISSION—Sliding.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

Ford. Model K, 40 M. P. Ford Motor Company, Detroit, Mich.



PRICE—$2,500.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Hub and transmission.
TIRES—32 x 4.
CYLINDERS—6 vertical.
COOLING—Water.
IGNITION—Magneto.
TRANSMISSION—Planetary.
SPEEDS—Two.
DRIVE—Direct.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.

Marion. Model 5, 24-38 M. P. Marion Motor Car Co., Indianapolis, Ind.



PRICE—$2,500.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—2, expanding in drums on rear wheels.
TIRES—32 x 4.
CYLINDERS—4 tandem.
COOLING—Air.
IGNITION—Jump spark, storage battery.
CLUTCH—Multiple disk.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—108 inches.
TREAD—56½ inches.
WEIGHT—2,100 pounds.

Marmon. Model C, 20-24 M.P. Nordyke & Marmon Co., Indianapolis, Ind.



PRICE—$2,500.
BODY—Cast aluminum entire.
SEATING CAPACITY—Four persons.
FRAME—Pressed steel, reinforced with wood.
BRAKES—Internal, expanding on rear wheels, band on transmission.
TIRES—32 x 4.
CYLINDERS—4, angle of 90 degrees.
COOLING—Air.
IGNITION—Jump spark, coils.
CLUTCH—Metal to metal, in oil.
TRANSMISSION—Planetary.
SPEEDS—2 and reverse.
DRIVE—Direct shaft drive, without cardan joint.
WHEEL BASE—90 inches.
TREAD—56½ inches.
WEIGHT—2,150 pounds.

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Jackson. Model G, 40-45 M.P. Jackson Automobile Co., Jackson, Mich.

PRICE—$2,500.
BODY—Wood, King of the Belgians.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Hub and propeller shaft.
TIRES—34 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Jump spark and storage battery.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel.
WHEEL BASE—108 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.



York. Model D, 30-35 M. P. York Automobile Co., York, Pa.

PRICE—$2,500.
BODY—Tonneau, wood.
SEATING CAPACITY—Five persons.
FRAME—Armored wood.
BRAKES—Internal expansion, rear hubs, propeller shaft.
TIRES—34 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Expanding ring.
TRANSMISSION—Sliding.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—102 inches.
TREAD—56 inches.
WEIGHT—2,350 pounds.



Grout, Model Gasoline, 35 M. P. Grout Brothers Automobile Co., Orange, Mass.

PRICE—$2,500.
BODY—Side entrance, 4 bow Cape top.
SEATING CAPACITY—Five persons.
FRAME—Armored.
BRAKES—External rear wheels and countershaft
TIRES—30 x 4.
CYLINDERS—4, singly.
COOLING—Water.

IGNITION—Single coil distributor.
CLUTCH—Cone.
TRANSMISSION—Sliding gear
SPEEDS—3 forward and reverse.
DRIVE—Side chain.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,300 pounds.



Wayne. Model K, 35 M. P. Wayne Automobile Co., Detroit, Mich.

PRICE—$2,500.
BODY—Touring.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—External and internal.
TIRES—32 x 4.
CYLINDERS—4, under hood front to rear.
COOLING—Water, cellular radiator.

IGNITION—Jump spark.
CLUTCH—Female cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—102 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Reo. Model Touring, 24 M. P. Reo Moto Car Co., Lansing, Mich.

PRICE—$2,500.
BODY—Wood; double side entrance tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—3 sprocket and double acting hub.
TIRES—32 x 4.
CYLINDERS—4 vertical, under hood.
COOLING—Water, positive gear pump.

IGNITION—Jump spark, storage batteries.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Direct shaft.
WHEEL BASE—100 inches.
TREAD—55 inches.
WEIGHT—2,000 pounds.



Upton. Model, 24-30 M. P. Lebanon Motor Works, Lebanon, Pa.

PRICE—$2,500.
BODY—Side entrance double phaeton.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On propeller shaft, on rear wheels.
TIRES—34 x 4.
CYLINDERS—4, vertical, in pairs, under hood.
COOLING—Water, by gear pump.

IGNITION—Jump spark.
CLUTCH—Internal expanding metal clutch
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Propeller shaft.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.



Apollo, Model A, 35 M.P. Chicago Recording Scale Co., Waukegan, Ill.

PRICE—$2,500.
BODY—King of Belgium, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel
BRAKES—Internal on hub and shaft.
TIRES—32.
CYLINDERS—4, cast in pairs.
COOLING—Vertical radiator.

IGNITION—Jump spark, 4 coils and battery.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.

Dolson. Model F, 38-40 M. P. Dolson Automobile Co., Charlotte, Mich.

PRICE—$2,500.
BODY—Surrey type, full aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—2 on hub, 1 on transmission.
TIRES—34 x 4.
CYLINDERS—4 vertical under bonnet.
COOLING—Water.

IGNITION—Jump spark
CLUTCH—
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—110 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.

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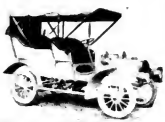
Rambler. Model 15, 35-40 M. P. Thos. B. Jeffery & Co., Kenosha, Wis.



PRICE—$2,500.
BODY—Double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Differential, expanding in rear wheels.
TIRES—34 x 4.
CYLINDERS—4, vertical, longitudinal in frame.
COOLING—Water, radiator, pump and fan.

IGNITION—Jump spark, 4 coils, storage battery.
CLUTCH—Cone in flywheel.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Individual chain to each rear wheel.
WHEEL BASE—112 inches.
TREAD—56½ inches.
WEIGHT—2,700 pounds.

Buick. Model D, 30-35 M. P. Buick Motor Co., Jackson, Mich.



PRICE—$2,500.
BODY—Wood, divided front seat, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal expansion hub, external on driving shaft.
TIRES—30 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Plate.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Direct shaft to rear axle.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.

Elmore. Model 15, 35 M. P. Elmore Mfg. Co., Clyde, O.



PRICE—$2,500.
BODY—Tonneau, bent wood seats.
SEATING CAPACITY—Five persons.
FRAME—Pressed, cold rolled steel.
BRAKES—2 internal expanding rings on rear wheels, 1 external band on propeller shaft.
TIRES—34 x 4.
CYLINDERS—Elmore 2-cycle, 4 cylinders, vertical, fore and aft, 4½ x 4.
COOLING—Water tank and radiator combined.

IGNITION—Roller contact, coil and battery.
CLUTCH—Mercedes type, expanding ring (bronze).
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Direct drive.
WHEEL BASE—104 inches.
TREAD—56 inches.

Buick. Model G, 30-35 M. P. Buick Motor Co., Jackson, Mich.

PRICE—$2,500.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—Hub.
TIRES—32 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.

Cadillac. Model H, 30 M. P. Cadillac Motor Car Co., Detroit, Mich.

PRICE—$2,500.
BODY—Double side door entrance, wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Double acting, expanding and contracting on rear wheel drums.
TIRES—32 x 4.
CYLINDERS—4, vertical, under hood.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3, forward and reverse.
DRIVE—Direct shaft, bevel gear.
WHEEL BASE—98 inches.
TREAD—56½ inches.
WEIGHT—2,400 pounds.

Pope-Hartford. Model F, 20-25 M. P. Pope Mfg. Co., Hartford, Conn.



PRICE—$2,500.
BODY—Double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Oak, armored with steel plates.
BRAKES—External band on propeller shaft, internal band on rear wheels.
TIRES—32 x 4.
CYLINDERS—4, vertical, cast in pairs.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Internal cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.

Berkshire. Model B, 25 M. P. Berkshire Automobile Co., Pittsfield, Mass.



PRICE—$2,500.
BODY—Wood, touring.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Outside band and internal expansion on rear wheels.
TIRES—4 inches.
CYLINDERS—4, in line (front to rear).
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Leather faced.
TRANSMISSION—Sliding shaft.
SPEEDS—3, ahead and reverse.
DRIVE—Double side chain.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.

Autocar. Type XII, 24-28 M. P. Autocar Company, Ardmore, Pa.



PRICE—$2,600.
BODY—Double side entrance tonneau.
SEATING CAPACITY—Five persons.
FRAME—Wood armored with pressed steel.
BRAKES—External and internal on drums of rear wheels.
TIRES—32 x 4.
CYLINDERS—4, vertical.
COOLING—Water, tubular radiator, fan, and centrifugal pump.

IGNITION—Jump spark.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,475 pounds.

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CARS COSTING FROM $2,750 TO $3,000



Acme. Model XIV, 30 M. P. — Acme Motor Car Co., Reading, Pa.

PRICE—$2,750.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—4, external band.
TIRES—34 x 4.
CYLINDERS—4, longitudinal with frame.
COOLING—Tubular radiator and fan.

IGNITION—Jump spark and batteries.
CLUTCH—Leather-faced cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—102 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Franklin. Model D, 20 M. P. — H. H. Franklin Mfg. Co., Syracuse, N. Y.

PRICE—$2,800.
BODY—Aluminum, side entrance, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Wood.
BRAKES—1 on countershaft and 2 equalising bands on rear wheels.
TIRES—32 x 3½.
CYLINDERS—4, vertical, under hood.
COOLING—Air.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—1,800 pounds.



Aerocar Car Model H, 24 M. P. — Aerocar Co., Detroit, Mich.

PRICE—$2,800.
BODY—Touring.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel straight members and sub-frame.
BRAKES—Rear wheel hub brakes and transmission.
TIRES—34 x 4.
CYLINDERS—4, vertical.
COOLING—Air.

IGNITION—Jump spark.
CLUTCH—Leather-faced cone, Panhard type.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Chainless bevel gear drive.
WHEEL BASE—104 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Glide, Model E. 30 M. P. — Bartholomew Co., Peoria, Ill.

PRICE—$3,000.
BODY—Double side entrance tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Transmission and emergency on rear wheels.
TIRES—32 x 4.
CYLINDERS—4, separate, vertical, 4¼ x 5.
COOLING—Water by gear pump and fan.

IGNITION—Jump spark, storage and dry cells.
TRANSMISSION—Planetary.
SPEEDS—3, ahead and reverse.
DRIVE—Bevel gear.
WHEEL BASE—103 inches.
TREAD—56 inches.
WEIGHT—1900 pounds.



Columbia. Mark XLVI. 24-28 M. P. — Electric Vehicle Co., Hartford, Conn.

PRICE—$3,000.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel, narrowed in front.
BRAKES—Contracting and expanding on rear hubs.
TIRES—32 x 3½ x 4.
CYLINDERS—4, cast in pairs, valves one side.
COOLING—Cellular radiator, flywheel fan, centrifugal pump.

IGNITION—Low tension magneto, make and break.
CLUTCH—Leather faced cone.
TRANSMISSION—Sliding gear selective.
SPEEDS—3, forward and reverse.
DRIVE—Propeller shaft, bevel gear, floating rear axle.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.



National. Model D, 35-40 M. P. — National Motor Vehicle Co., Indianapolis, Ind.

PRICE—$3,000.
BODY—Aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—4, internal expanding on rear hubs.
TIRES—34 x 4.
CYLINDERS—4, vertical, individually mounted.
COOLING—Water, cellular cylindrical roolrr, gear pump.

IGNITION—Dry cells, storage battery with dynamo, jump spark.
CLUTCH—Self-contained cushion cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear shaft drive.
WHEEL BASE—104 inches.
TREAD—54 inches.
WEIGHT—2,500 pounds.

Marmon. Model D, 26-30 M.P. Nordyke & Marmon Co., Indianapolis, Ind.

PRICE—$3,000.
BODY—Cast aluminum entire.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel, reinforced with wood.
BRAKES—Internal, expanding on rear wheels, band brake on transmission.
TIRES—32 x 4.
CYLINDERS—4, angle 90 degrees, two on each side.
COOLING—Air.

IGNITION—Jump spark, coils.
CLUTCH—Metal to metal, in oil.
TRANSMISSION—Planetary.
SPEEDS—2 and reverse.
DRIVE—Shaft, direct without cardan joints.
WHEEL BASE—90 inches.
TREAD—56½ inches.
WEIGHT—2,300 pounds.

Frayer-Miller 24 M. P. — Oscar Lear Automobile Co. Columbus, Ohio

PRICE—$3,000.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal, external, on hubs of rear wheels.
CYLINDERS—4, tandem, or fore and aft.
COOLING—Air, for forced draught from blower.

IGNITION—Jump spark, dry battery, storage battery, or magneto.
CLUTCH—Cone, leather faced with springs.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Propeller shaft.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.

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Schacht. Models F and G, 40 M. P.

Schacht Mfg. Co., Cincinnati, O.

PRICE—$2,850 and $3,000.
BODY—Side entrance.
SEATING CAPACITY—Six persons.
FRAME—Pressed steel.
BRAKES—1 in countershaft, 1 in each rear wheel.
TIRES—34 x 4.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Dynamo, storage battery.
CLUTCH—Friction expanding band.
TRANSMISSION—Sliding gear.
SPEEDS—3, ahead and reverse.
DRIVE—Shaft.
WHEEL BASE—102 inches.
TREAD—54 inches.
WEIGHT—2,700 pounds.



Adams-Farwell Model 6-B, 40 M. P.

Adams Co., Dubuque, Ia.

PRICE—$3,000.
BODY—Brougham.
SEATING CAPACITY—Seven persons.
FRAME—Angle iron.
BRAKES—Transmission, rear hubs, internal expanding.
TIRES—34 x 4 x 4½.
CYLINDERS—8, in circle revolving, 5 x 5.
COOLING—Air.

IGNITION—Jump spark with dry cells or storage batteries.
CLUTCH—Bronze band between two cast-iron surfaces.
TRANSMISSION—Planetary.
SPEEDS—4, forward and reverse.
DRIVE—Single chain.
WHEEL BASE—90 inches.
TREAD—56½ inches.
WEIGHT—2,500 pounds.



Locomobile. Model E, 15-20 H. P.

Locomobile Company of America, Bridgeport, Conn.

PRICE—$3,000.
BODY—Double side entrance, fitted with top irons.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Metal to metal, internal expansion.
TIRES—32 x 4.
CYLINDERS—4, longitudinal.
COOLING—Cellular radiator, gear driven centrifugal pump.

IGNITION—Make and break, iridium contacts low tension magneto.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double side chains.
WHEEL BASE—93 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Lambert. Model 8, 34 M. P.

Buckeye Mfg. Co., Anderson, Ind.

PRICE—$3,000.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Angle iron.
BRAKES—On differential, expansion in hubs.
TIRES—34 x 4½.
CYLINDERS—4, vertical.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Friction drive.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Moon. Model A, 30-35 M. P.

Moon Motor Car Company, St. Louis, Mo.

PRICE—$3,000.
BODY—Tonneau.
SEATING CAPACITY—Five passengers.
FRAME—Cold pressed steel.
BRAKES—3.
TIRES—4 inch.
CYLINDERS—4, vertical, mounted on sub-frame, Rutenber.
COOLING—Honeycomb pattern with fan.

IGNITION—Jump spark, storage battery and coil.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—106 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

Cadillac. Model H, Coupe.

Cadillac Motor Car Co., Detroit, Mich.

PRICE—$3,000.
BODY—Coupe.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—Double acting, expanding and contracting on rear wheel drums.
TIRES—32 x 4.
CYLINDERS—4, vertical, under hood.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3 forward and reverse.
DRIVE—Direct shaft, bevel gear.
WHEEL BASE—98 inches
TREAD—56½ inches.
WEIGHT—2,500 pounds.

Northern. Model K, 30-35 M. P.

Northern Mfg. Co., Detroit, Mich.

PRICE—$3,000.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Steel.
BRAKES—Compressed air, external band, expansion band, foot type.
TIRES—32 x 4.
CYLINDERS—4, vertical, tandem, at front under hood.
COOLING—Water.

IGNITION—Jump spark with storage batteries.
CLUTCH—Air clutch.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Direct shaft bevel gear.
WHEEL BASE—112 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.



Pungs-Finch. Model Finch Limited, 50 M. P.

Pungs-Finch Automobile & Gas Engine Co. Detroit, Mich.

PRICE—$3,000 to $3,500.
BODY—Tonneau.
SEATING CAPACITY—
FRAME—Pressed steel.
BRAKES—Exterior on rear hubs and on transmission shaft.
TIRES—34 x 4
CYLINDERS—4, vertical, 5⅜ x 6¾ inches.
COOLING—Water.

IGNITION—Magneto and storage battery, jump spark.
CLUTCH—Cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—110 inches.
TREAD—56 inches.
WEIGHT—2,650 pounds.

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CARS COSTING FROM $3,500 TO $5,500

Thomas. Model 31, 50 M. P. — E. R. Thomas Motor Co., Buffalo, N. Y.



PRICE—$3,500, Touring; $4,500, Limousine; $4,600, Landaulette.
BODIES—Touring, Limousine and Landaulette.
SEATING CAPACITY—Seven persons.
FRAME—Cold pressed steel, reinforced and trussed.
BRAKES—4 on rear wheels, 2 internal expanding and 2 external contracting.
TIRES—34 x 4½.
CYLINDERS—4 vertical, individual.
COOLING—Water and fan.

IGNITION—Jump spark with single coil, magneto optional.
CLUTCH—Triple plate metallic.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—118 inches.
TREAD—56½ inches.
WEIGHT—3,200 pounds.

Cleveland. Model F, 30-35 M. P. — Cleveland Motor Co., Cleveland, O.



PRICE—$3,500.
BODY—Victoria or tulip.
SEATING CAPACITY—Five persons.
FRAME—Cold rolled steel, channel section.
BRAKES—Double acting, expanding on rear hubs, propeller shaft.
TIRES—34 x 4.
CYLINDERS—4, longitudinally, vertical.
COOLING—Water.

IGNITION—Simms Bosch magneto, low tension, make-and-break spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—104 inches.
TREAD—56 inches.
WEIGHT—2,300 pounds.

Haynes. Model R, 45-50 M. P. — Haynes Automobile Co., Kokomo, Ind.



PRICE—$3,500.
BODY—Wood and aluminum.
SEATING CAPACITY—Five persons.
FRAME—Channel section pressed steel.
BRAKES—Internal, emergency external on wheel hubs.
TIRES—34 x 4½.
CYLINDERS—4, separate castings, vertical.
COOLING—Water, force pump, radiator and fan.

IGNITION—Jump spark.
CLUTCH—Constricting; Haynes.
TRANSMISSION—Haynes sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Roller gear; Haynes.
WHEEL BASE—108 inches.
TREAD—56 inches.
WEIGHT—2,800 pounds.

Ardsley. Model B, 35-40 M. P. — Ardsley Motor Car Company, Yonkers, N. Y.



PRICE—$3,500.
BODY—Side entrance, wood or aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal expanding, metal to metal.
TIRES—34 x 4.
CYLINDERS—4, vertical and parallel with car.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Aluminum cone, leather faced.
TRANSMISSION—Sliding.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.

Cannon. Model No. 2, 50 M. P. — Burtt Mfg. Co., Kalamazoo, Mich.



PRICE—$3,500.
BODY—Side entrance.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—On wheels and on countershaft.
TIRES—34 x 4½.
CYLINDERS—4, 5 x 5, vertical, under hood
COOLING—Water, with rotary pump and fan.

IGNITION—Jump spark, storage and dry cells.
CLUTCH—Disc.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.

Wayne. Model F, 50 M. P. — Wayne Automobile Co., Detroit, Mich.



PRICE—$3,500.
BODY—Wood, side entrance.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Internal expanding and external.
CYLINDERS—4, under hood front to rear.
COOLING—Water, cellular radiator.

IGNITION—Jump spark, storage battery.
CLUTCH—Female cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft drive, direct on high.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

Acme. Model XV, 40 M. P. — Acme Motor Car Co., Reading, Pa.



PRICE—$3,500.
BODY—Wood.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—4, external, band.
TIRES—34 x 4½.
CYLINDERS—4, longitudinal with frame.
COOLING—Tubular radiator and fan.

IGNITION—Jump spark and batteries.
CLUTCH—Multiple disc.
TRANSMISSION—Selective sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,600 pounds.

Royal Tourist. Model G, 40 M. P. — Royal Motor Car Co., Cleveland, O.



PRICE—$3,500.
BODY—Wood, King of Belgians.
SEATING CAPACITY—Six persons.
FRAME—Pressed steel.
BRAKES—3, internal expanding.
TIRES—4½ x 34.
CYLINDERS—4, vertical, 5 x 5½, in pairs.
COOLING—Water, gear pump.

IGNITION—Jump spark.
CLUTCH—Conical, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—111 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

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Pope-Toledo. Model Type XII, 35-40 M. P.

PRICE—$3,500.
BODY—Double side entrance.
SEATING CAPACITY—Seven persons.
FRAME—Steel.
BRAKES—On hubs of rear wheels.
TIRES—34 x 4.
CYLINDERS—4, individual, twin-head, copper jacketed.
COOLING—Water and radiator.

Pope Motor Car Co., Toledo, O.

IGNITION—Jump spark, coils and battery.
CLUTCH—Internal conical, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward, 1 reverse.
DRIVE—Double direct outside chain.
WHEEL BASE—104 inches.
TREAD—56 inches.
WEIGHT—2,700 pounds.



Cadillac. Model L, 40 M. P.

PRICE—$3,750.
BODY—Wood, touring car.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Double acting, expanding and contracting on rear wheel drums.
TIRES—36 x 4 x 4½.
CYLINDERS—4, vertical, under hood.
COOLING—Water.

Cadillac Motor Car Co., Detroit, Mich.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3, forward and reverse.
DRIVE—Direct shaft, bevel gear.
WHEEL BASE—110 inches.
TREAD—56½ inches.
WEIGHT—2,850 pounds.



Peerless. Model 14, 30 M. P.

PRICE—$3,750.
BODY—Metal, double side entrance. King of Belgium.
SEATING CAPACITY—Five to seven persons.
FRAME—Cold rolled steel.
BRAKES—2 external and internal bands on rear wheels.
TIRES—36 x 4.
CYLINDERS—4, vertical, cast in pairs.
COOLING—Water, gear pump.

Peerless Motor Car Co., Cleveland, O.

IGNITION—Jump spark and batteries.
CLUTCH—Internal expanding.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Shaft, bevel gears.
WHEEL BASE—107 inches.
TREAD—56 inches.
WEIGHT—2,700 pounds.



Chadwick Model 12, 24-30 M. P.

PRICE—$4,000.
BODY—King of Belgium, aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel, reinforced.
BRAKES—On countershaft, double acting; 2 expanding compensating on rear wheels.
TIRES—34 x 4 x 4½.
CYLINDERS—4, vertical.
COOLING—Water, Whitlock cooler.

Fairmount Engineering Works, Phil., Pa.

IGNITION—Jump spark storage battery.
CLUTCH—Cone, rocking type.
TRANSMISSION—Clash gear, direct on high speed.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—102 inches.
TREAD—56 inches.
WEIGHT—2,700 pounds.



Franklin. Model H, 30 M. P.

PRICE—$4,000.
BODY—Aluminum, side entrance, detachable tonneau.
SEATING CAPACITY—Five persons.
FRAME—Wood.
BRAKES—1 on countershaft, 2 equalizing bands on rear wheels.
TIRES—34 x 4.
CYLINDERS—6, vertical, under hood.
COOLING—Air.

H. H. Franklin Mfg. Co., Syracuse, N. Y.

IGNITION—Jump spark.
CLUTCH—Multiple disc clutch.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—119 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.



National, Model E, 50-60 M. P.

PRICE—$4,000.
BODY—Aluminum.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—4, internal-expanding on rear hubs; 2 systems.
TIRES—34 x 4½.
CYLINDERS—6 vertical, individually mounted.
COOLING—Water, cellular, cylindrical cooler, gear pump.

National Motor Vehicle Co., Indianapolis, Ind.

IGNITION—Jump spark, 2 sets of storage batteries, with dynamo.
CLUTCH—Self-contained cushioned cone.
TRANSMISSION—Slide gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear shaft.
WHEEL BASE—121 inches.
TREAD—56½ inches.



Rainier. Model B, 30-35 M. P.

PRICE—$4,000.
BODY—Full aluminum, double side entrance.
SEATING CAPACITY—Five persons.
FRAME—Cold rolled pressed steel, aluminum under bonnet.
BRAKES—Internal expansion on rear hubs and on propeller shaft.
TIRES—34 x 4.
CYLINDERS—4, 4½ x 5.
COOLING—Centrifugal pumps.

Rainier Automobile Co., New York

IGNITION—Make and break magneto, Simms Bosch.
CLUTCH—Cone, leather face.
TRANSMISSION—Sliding train.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—104 inches.
TREAD—56 inches.



Frayer-Miller 36 M. P.

PRICE—$4,000.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal and external.
TIRES—34 x 4.
CYLINDERS—6, tandem or fore and aft.
COOLING—Air, by powerful blowers.

Oscar Lear Automobile Co. Columbus, Ohio

IGNITION—Jump spark, storage, dry battery, or magneto.
CLUTCH—Cone, leather faced.
TRANSMISSION—Sliding gears, selective.
SPEEDS—4, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—106 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

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Packard. Model 24, 24 M. P. — Packard Motor Car Co., Detroit, Mich.

PRICE—$4,000.
BODY—Double side-entrance phaeton.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—4, double acting direct on rear wheels.
TIRES—Front, 34 x 4; rear, 34 x 4½.
CYLINDERS—4, vertical, fore and aft.
COOLING—Water, positive circulation.
IGNITION—Magneto and storage battery.
CLUTCH—Expanding band.
TRANSMISSION—Sliding gears direct on rear axle.
SPEEDS—3, forward and reverse.
DRIVE—Shaft and bevel gears.
WHEEL BASE—119 inches.
TREAD—56½ inches.
WEIGHT—2,740 pounds.



Packard. Model 24, M. P. — Packard Motor Car Co., Detroit, Mich.

PRICE—$4,000.
BODY—Runabout.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—4, double acting and operating direct on rear wheels.
TIRES—34 x 3½ x 4.
CYLINDERS—4, vertical, fore and aft.
COOLING—Water, positive circulation.
IGNITION—Magneto, storage battery.
CLUTCH—Expanding band.
TRANSMISSION—Sliding gears direct on rear axle.
SPEEDS—3, forward and reverse.
DRIVE—Shaft and bevel gears.
WHEEL BASE—108 inches.
TREAD—56½ inches.



Welch. Model F, 50 M. P. — Welch Motor Car Co., Pontiac, Mich.

PRICE—$4,000.
BODY—Open wood.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal hub and propeller shaft.
TIRES—36 x 4½.
CYLINDERS—4, tandem.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear, with multiple disc clutches.
SPEEDS—2 and reverse.
DRIVE—Bevel gear.
WHEEL BASE—119 inches.
TREAD—56 inches.
WEIGHT—2,800 pounds.



Pierce. Model, Great Arrow, 28-32 M. P. — The George N. Pierce Co., Buffalo, N. Y.

PRICE—$4,000, without top.
BODY—Straight line, side entrance, cast aluminum.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed carbon steel, channel section.
BRAKES—Inside and outside of drums on rear wheel hubs.
TIRES—34 x 4 x 4½, non-skid in rear.
CYLINDERS—4, vertical, 4¼ x 4¾.
COOLING—Whitlock radiator.
IGNITION—Jump spark.
CLUTCH—Friction clutch.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—107 inches.
TREAD—56 inches.
WEIGHT—2,700 pounds.



Knox. Model G, 35-40 M. P. — Knox Automobile Company, Springfield, Mass.

PRICE—$4,000, without top.
BODY—Wood and sheet metal.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
TIRES—34 x 4 x 4½.
CYLINDERS—4, vertical, fore and aft.
COOLING—Air.
IGNITION—Jump spark, magneto and dry cells.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Bevel gear and side chain.
WHEEL BASE—112 inches.
TREAD—56 inches.
WEIGHT—2,800 pounds.



Stearns. 40-45 M.P. — F. B. Stearns Company, Cleveland, O.

PRICE—$4,250.
BODY—French type, side entrance, cast aluminum
SEATING CAPACITY—Five persons normal, with door seats seven
FRAME—Pressed steel.
BRAKES—Inner expanding on rear wheels, band on differential.
TIRES—36 x 4 x 4½.
CYLINDERS—4, vertical, in pairs.
COOLING—Water.
IGNITION—Magneto, high tension, batteries for starting.
CLUTCH—Inner expanding on rim of flywheel.
TRANSMISSION—Sliding gear.
SPEEDS—4, ahead and reverse.
DRIVE—Double chain.
WHEEL BASE—118 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.



Columbia. Mark XLVII. 40-45 M. P. — Electric VehicleCo., Hartford, Conn.

PRICE—$4,500.
BODY—Side entrance.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Internal expanding in sprocket-shaft and on rear wheel drums.
TIRES—36 x 4 x 4½.
CYLINDERS—4, cast in pairs, valves one side.
COOLING—Cellular and fan, 810 sq. in. front surface.
IGNITION—Storage battery, jump spark.
CLUTCH—Leather faced cone.
TRANSMISSION—Sliding gear selective.
SPEEDS—4, ahead, one reverse.
DRIVE—Double chain.
WHEEL BASE—108 inches.
TREAD—55 inches.
WEIGHT—3,000 pounds.

Jones-Corbin. Model L, 45 M. P. — Jones-Corbin Motor Co., Phil'a, Pa.

PRICE—$4,500.
BODY—Side entrance tonneau.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel reinforced with wood, 5 x 2 in.
BRAKES—Internal and external on rear drums.
TIRES—34 x 4 x 5.
CYLINDERS—4, in pairs.
COOLING—Water.
IGNITION—La Coste magneto and coil, 8 plugs.
CLUTCH—Expanding.
TRANSMISSION—Sliding gear.
SPEEDS—3, ahead and reverse.
DRIVE—Double chain.
WHEEL BASE—110 inches.
TREAD—56 inches.
WEIGHT—2,650 pounds.

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Berkshire. Model C. 40 M.P. Berkshire Automobile Co., Pittsfield, Mass.

PRICE—$4,500.
BODY—Wood, touring.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Outside band and internal expansion on rear wheel.
TIRES—5 inches.
CYLINDERS—6, in line (front to rear).
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Leather faced.
TRANSMISSION—Sliding shaft.
SPEEDS—3, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—128 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.



Austin. Model LX., 60 M.P. Austin Automobile Co., Grand Rapids, Mich.

PRICE—$4,500.
BODY—Wood.
SEATING CAPACITY—Five persons.
FRAME—Angle steel.
BRAKES—Expanding on rear wheels, driving shaft.
TIRES—36 x 4½.
CYLINDERS—4, upright, in front.
COOLING—Water.
IGNITION—High tension magneto, batteries.
CLUTCH—Metal to metal, in oil.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—109 inches.
TREAD—56 inches.
WEIGHT—2,800 pounds.



Chadwick. Model 11, 40-45 M.P. Fairmount Engineering Works, Phil., Pa.

PRICE—$5,000.
BODY—Side entrance aluminum, King of Belgium.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel, reinforced.
BRAKES—Countershaft double acting, 2 expanding compensating on rear wheels.
TIRES—34 x 4½.
CYLINDERS—4 vertical.
COOLING—Water, gear pump, Whitlock cooler.
IGNITION—Jump spark, high tension magneto or storage battery.
CLUTCH—Rocking type.
TRANSMISSION—Sliding gear.
SPEEDS—4, ahead and reverse.
DRIVE—Double side chain.
WHEEL BASE—108 inches or more.
THEAD—56 inches.
WEIGHT—2,000 pounds.



Simplex. 30 M.P. Smith & Mabley, Inc., New York, N. Y.

PRICE—Chassis, $5,000.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Differential, on rear wheels.
TIRES—Front, 910 x 90; rear, 920 x 120 m.m.
CYLINDERS—4, upright, in pairs.
COOLING—Centrifugal pump, cooler and fan.
IGNITION—Jump spark, or magneto, or both.
CLUTCH—Friction cone, aluminum leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—106-112 inches.
TREAD—56 inches.
WEIGHT—2,160 pounds.



Welch. Model D. 50 M.P. Welch Motor Car Co., Pontiac, Mich.

PRICE—$5,000.
BODY—Limousine, wood.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Internel hub and propeller shaft.
TIRES—36 x 4½.
CYLINDERS—4, tandem.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—2 and reverse.
DRIVE—Bevel gear.
WHEEL BASE—119 inches.
TREAD—56 inches.
WEIGHT—3,400 pounds.



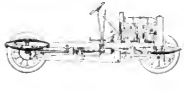
Sturtevant. Model Touring, 40-50 M.P. Sturtevant Mill Co., Boston, Mass.

PRICE—$5,000.
BoDY—Optional.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Automatic and internal expanding on rear wheels.
TIRES—34 x 4½.
CYLINDERS—4, tandem and vertical, or 6 horizontal-opposed.
COOLING—Water, radiator in front.
IGNITION—Jump spark, storage and cell battery.
CLUTCH—Automatic multiple disc.
TRANSMISSION—Automatic.
SPEEDS—All speeds and reverse.
DRIVE—Direct shaft and bevel gear on rear axle.
WHEEL BASE—120 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.



Knox. Model G. 35-40 M.P. Knox Automobile Company Springfield, Mass.

PRICE—$5,000.
BODY—Wood, Limousine.
SEATING CAPACITY—6 persons.
FRAME—Pressed steel.
BRAKES—
TIRES—34 x 4 x 4½.
CYLINDERS—4, vertical, fore and aft.
COOLING—Air.
IGNITION—Jump spark, magneto and dry cells.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Bevel gear and side chain.
WHEEL BASE—112 inches.
TREAD—56 inches.
WEIGHT—3,200 pounds.



Moore. Model. 40 M.P. Moore Automobile Co., New York

PRICE—Chassis, $5,000.
BODY—Optional, top also.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Transmission and emergency on rear wheels.
TIRES—36 x 5.
CYLINDERS—4, separate, with electrical deposited copper water jackets.
COOLING—Direct connected centrifugal pump.
IGNITION—Triple high tension, 2 magnetos and coil.
CLUTCH—Double cone, metal to metal, in oil bath.
TRANSMISSION—Sliding gear.
BALL BEARINGS—Throughout.
SPEEDS—4 forward and reverse.
DRIVE—Bevel gear.
TREAD—56 inches.
WEIGHT.

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Gasaulec Model, Touring.
40-45 M.P.

PRICE—$5,000.
BODY—Aluminum or wood tonneau, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal expanding on rear wheel, magnetic brake on propeller shaft.
TIRES—34 x 4½.
CYLINDERS—4, tandem.
COOLING—Water, natural circulation.

Corwin Manufacturing Co.
Peabody, Mass.

IGNITION—Jump spark.
CLUTCH—Magnetic clutch on one speed or the other.
TRANSMISSION—Planetary and electro-magnetic combination.
SPEEDS—2 forward and reverse.
DRIVE—Bevel.
WHEEL BASE—108 inches.
TREAD—54 inches.
WEIGHT—2,600 pounds.



Locomobile, Model H.
30-35 M. P.

PRICE—$5,000.
BODY—Double side entrance.
SEATING CAPACITY—Five to seven persons
FRAME—Pressed steel.
BRAKES—Metal to metal, internal expansion rear hubs.
TIRES—34 x 4½.
CYLINDERS—4, longitudinal.
COOLING—Cellular radiator, gear-driven centrifugal pump.

Locomobile Company of America
Bridgeport, Conn.

IGNITION—Make and break, iridium contacts low tension magneto.
CLUTCH—Cone, leather face.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—106 inches
TREAD—54 inches.
WEIGHT—2,800 pounds.



Pierce. Model Great Arrow,
40-45 M. P.

PRICE—$5,000, without top.
BODY—Victoria, side entrance, cast aluminum.
SEATING CAPACITY—Five to seven persons
FRAME—Pressed carbon steel, channel section.
BRAKES—Inside and outside of drums on rear wheel hubs.
TIRES—36 x 4½ x 5; non-skid on rear.
CYLINDERS—4, vertical, 5 x 5½.
COOLING—Water, Whitlock radiator.

George N. Pierce Co.
Buffalo, N. Y.

IGNITION—Jump spark.
CLUTCH—Friction clutch.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—120 inches.
TREAD—56 inches.
WEIGHT—3,100 pounds.

Cadillac. Model L, Limousine,
40 M. P.

PRICE—$5,000.
BODY—Wood, Limousine.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Double acting, expanding and contracting on rear wheel drums.
TIRES—36 x 4 x 4½.
CYLINDERS—4, vertical, under hood.
COOLING—Water.

Cadillac Motor Car Co.,
Detroit, Mich.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—3, forward and reverse.
DRIVE—Direct shaft, bevel gear.
WHEEL BASE—110 inches.
TREAD—56½ inches.
WEIGHT—3,000 pounds.



Apperson.
50 M. P.

PRICE—$5,500.
BODY—Touring.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—3 external.
TIRES—32 x 4; 32½ x 4.
CYLINDERS—4, separate vertical.
COOLING—Water.

Apperson Bros. Automobile Co.
Kokomo, Ind.

IGNITION—Double system, high tension magneto and battery.
CLUTCH—Patented band clutch.
TRANSMISSION—Sliding gears.
SPEEDS—3, forward and reverse.
DRIVE—Double side chains.
WHEEL BASE—116 inches.
THEAD—56 inches.
WEIGHT—2,800 pounds.



Woods. Model 40. 40-42 M. P.

PRICE—$5,500.
BODY—Limousine.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—2 sets.
TIRES—36 x 4½.
CYLINDERS—4, separate, vertical, 5 x 5.
COOLING—Water.

Woods Motor Vehicle Co., Chicago, Ill.

IGNITION—Jump spark.
CLUTCH—Internal cone, leather face.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Side chain.
WHEEL BASE—120 inches.
TREAD—56½ inches.
WEIGHT—3,500 pounds.



Lozier. Model C, 35 M. P.

PRICE—$4,500, $5,500.
BODY—Tonneau, Limousine and Landaulette.
SEATING CAPACITY—Five persons.
FRAME—Cold pressed steel.
BRAKES—2 enclosed on rear wheels, differential shaft.
TIRES—36 x 4 x 4½.
CYLINDERS—4, in pairs.
COOLING—Water.

Lozier Motor Co., New York, N. Y.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Double chain.
WHEEL BASE—115½ inches.
TREAD—56 inches.
WEIGHT—2,750 pounds.



Lozier. Model E, 60 M. P.

BODY—Tonneau.
SEATING CAPACITY—Seven persons.
FRAME—Cold pressed steel.
BRAKES—3.
TIRES—36 x 4 x 4½.
CYLINDERS—4, in pairs.
COOLING—Water.

Lozier Motor Co., New York, N. Y.

IGNITION—Jump spark, Simms Bosch high tension magneto.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, selective type.
DRIVE—Double chain.
WHEEL BASE—115½ inches.
TREAD—56 inches.
WEIGHT—2,850 pounds.

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Lozier. Model Limousine, 35 M. P. Lozier Motor Co., New York, N. Y.

PRICE—$5,500.
BODY—Limousine.
SEATING CAPACITY—Five persons.
FRAME—Cold pressed steel.
BRAKES—Enclosed on rear wheels, on differential.
TIRES—4 x 4½.
CYLINDERS—4, in pairs.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—115⅝ inches.
TREAD—56 inches.
WEIGHT—2,750 pounds.



Lozier. Model Landaulet, 35 M. P. Lozier Motor Co, New York, N. Y.

PRICE—$5,500.
BODY—Landaulet.
SEATING CAPACITY—Five persons.
FRAME—Cold pressed steel.
BRAKES—Enclosed on rear wheels, on differential.
TIRES—4 x 4½.
CYLINDERS—4, in pairs.
COOLING—Water.
IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—115⅝ inches.
TREAD—56 inches.
WEIGHT—2,750 pounds.

Austin. Model LX., 60 M. P. Austin Automobile Co., Grand Rapids, Mich.

PRICE—$6,000.
BODY—Limousine.
SEATING CAPACITY—Seven persons.
FRAME—Angle steel.
BRAKES—Rear wheel and driving shaft.
TIRES—36 x 4½.
CYLINDERS—4 vertical in front.
COOLING—Water.
IGNITION—High tension magneto, batteries and vibrating coil.
CLUTCH—Metal to metal, in oil.
TRANSMISSION—Sliding gear, selective.
SPEEDS—4, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—144 inches.
TREAD—56 inches.
WEIGHT—3,300 pounds.



Matheson. 40 M P. M. Matheson Motor Car Co., Wilkes-Barre, Pa.

PRICE—$6,000.
BODY—Quimby, aluminum, side entrance.
SEATING CAPACITY—Seven persons.
FRAME—Cold-pressed nickel steel.
BRAKES—2 bands on sprocket shafts, 2 clutches in rear wheel hubs.
TIRES—36 x 4 x 4½.
CYLINDERS—4, vertical.
COOLING—Water.
IGNITION—Make and break with magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gears, selective.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—112 inches.
TREAD—56 inches.
WEIGHT—2,900 pounds.

Tincher. 50 M. P. Tincher Motor Car Company, Chicago, Ill.

PRICE—$6,000.
BODY—Touring.
SEATING CAPACITY—Seven persons.
FRAME—Angle iron, side frame.
BRAKES—On rear hubs and on jack shaft.
TIRES—34 x 4 x 4½.
CYLINDERS—4, vertical.
COOLING—Water.
IGNITION—Jump spark, storage battery.
TRANSMISSION—Sliding gear, selective type.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—119½ inches.
TREAD—56 inches.
WEIGHT—2,800 pounds.

Christie. Model Touring, 50 M. P. Christie Direct Action Motor Car Co., New York, N. Y.

PRICE—$6,500.
BODY—Side entrance tonneau.
SEATING CAPACITY—Five persons.
FRAME—Channel steel, hand forged.
BRAKES—Rear wheels.
TIRES—30 x 4 inches.
CYLINDERS—4, vertical, 5¼ x 7, transverse.
COOLING—Water.
IGNITION—High tension magneto, or battery.
CLUTCH—Crucible steel.
TRANSMISSION—Direct.
SPEEDS—Forward and reverse.
DRIVE—Direct on front wheels.
WHEEL BASE—100 inches.
TREAD—6½ standard.
WEIGHT—1,550 pounds.



American Mercedes. Model A, 40-45 M. P. The Daimler Mfg. Co., Long Island City, N. Y.

PRICE—$7,500.
BODY—Double side entrance, tulip back.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Differential, countershaft, water cooled and emergency.
TIRES—940 x 100 mm.; 920 x 120 mm.
CYLINDERS—4 vertical, in pairs.
COOLING—Water, centrifugal pump, cellular cooler.
IGNITION—Make and break, Simms Bosch magneto.
CLUTCH—Standard Mercedes.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—127 inches, or 3.225 mm.
TREAD—56 inches.
WEIGHT OF CHASSIS—Approximately 2,250 pounds.



Matheson. 60 M. P. Matheson Motor Car Co., Wilkes-Barre, Pa.

PRICE—$7,500.
BODY—Quimby, aluminum, side entrance.
SEATING CAPACITY—Seven persons.
FRAME—Cold-pressed nickel steel.
BRAKES—2 bands on sprocket shafts, 2 clutches in rear wheel hubs.
TIRES—36 x 4 x 4½.
CYLINDERS—4, vertical.
COOLING—Water.
IGNITION—Make and break with magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gears, selective.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—118 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.

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FOREIGN CARS



Fiat. 20 M. P. Hol-Tan Co., New York, N. Y.

PRICE—$7,000.
BODY—Choice.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Internal expanding.
TIRES—910 x 100; 920 x 120 m.m.
CYLINDERS—4 in pairs.
COOLING—Daimler radiator.

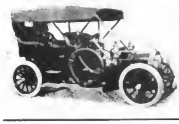
IGNITION—Make and break low tension, Simms Bosch magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Selective sliding gears.
SPEEDS—4 and reverse.
DRIVE—Double chain.
WHEEL BASE—111, 119 and 125 inches.
TREAD—54 inches.
WEIGHT—3,200 pounds.



Pipe. 50-85 M. P. Joseph S. Heller, New York, N. Y.

PRICE—$9,500.
BODY—Touring.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Rear wheels, differential, and change speed shaft.
TIRES—910 x 90 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Water.

IGNITION—Jump spark, high tension magneto cells and accumulators.
CLUTCH—Jenatzy Magnetic Clutch
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—123 inches.
TREAD—57 inches.
WEIGHT—2,800 pounds.



Martini, Model Touring, 30-40 M. P. Palmer & Christie, New York, N.Y.

PRICE—$9,500
BODY—Side entrance tonneau, tulip type.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel, narrow front.
BRAKES—Differential, internal expanding.
TIRES—Front, 915 x 105; rear, 920 x 120 m.m.
CYLINDERS—4, vertical, in pairs.
COOLING—Water.

IGNITION—Low tension magneto, make and break.
CLUTCH—Expanding steel, metal to metal
TRANSMISSION—Sliding gear, four way lever
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—116 inches
TREAD—56 inches.
WEIGHT—3,500 pounds.



Fiat. 35 M. P. Hol-Tan Co., New York

PRICE—$9,000
BODY—Choice
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Internal expanding.
TIRES—910 x 90; 920 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Daimler radiator.

IGNITION—Make and brake low tension Simms-Bosch magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—4 and reverse.
DRIVE—Double chain.
WHEEL BASE—111, 122 and 134 inches.
TREAD—54 inches
WEIGHT—3,350 pounds.



Pipe. 50 M.P. Joseph S. Heller, New York, N. Y.

PRICE—$10,500.
BODY—Limousine.
SEATING CAPACITY—Six persons.
FRAME—Pressed steel.
BRAKES—2.
TIRES—91 x 90; 920 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Water

IGNITION—Jump spark, high tension, magneto accumulators and coil.
CLUTCH—Jenatzy Magnetic Clutch
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—123 inches
TREAD—57 inches.
WEIGHT—2,800 pounds.



Fiat. 50 M. P. Hol-Tan Co., New York, N. Y.

PRICE—$12,000
BODY—Choice.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Internal expanding.
TIRES—910 x 90; 920 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Daimler radiator.

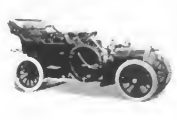
IGNITION—Make and break low tension, Simms Bosch magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Selective sliding gears.
SPEEDS—4 and reverse.
DRIVE—Double chain.
WHEEL BASE—116, 124 and 134 inches.
TREAD—54 inches.
WEIGHT—3,500 pounds.



Pipe. 28-35 M.P. Joseph S. Heller, New York, N. Y.

PRICE—$7,500.
BODY—Touring.
SEATING CAPACITY—Six persons.
FRAME—Pressed steel.
BRAKES—2, and on differential.
TIRES—870 x 90; 880 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Water.

IGNITION—Jump spark, high tension magneto-accumulator and coil.
CLUTCH—Metal spiral spring or Jenatzy cup-nelle clutch.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—117 inches.
TREAD—57 inches.
WEIGHT—2,350 pounds.



Martini, Model Touring, 20-24 M. P. Palmer & Christie, New York, N. Y.

PRICE—$7,500.
BODY—Double side entrance tonneau, tulip.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On differential, internal expanding on rear wheels.
TIRES—875 x 105 m.m.
CYLINDERS—4, vertical, in pairs.
COOLING—Water.

IGNITION—Low tension magneto, make and break.
CLUTCH—Expanding steel, metal to metal.
TRANSMISSION—Sliding gear.
SPEEDS—4 forward and reverse.
DRIVE—Chain, four way lever system.
WHEEL BASE—110 inches.
TREAD—56 inches.
WEIGHT—2,700 pounds.

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Aster. 30 M. P. Aster Co., New York City

PRICE—$6,500.
BODY—Detachable Limousine.
SEATING CAPACITY—Five persons.
FRAME—French pressed steel.
BRAKES—3.
TIRES—910 x 90; 920 x 120 m.m.
CYLINDERS—4 separate.
COOLING—Water.
IGNITION—Carter system magneto.
TRANSMISSION—Sliding gear, Mulleet & Bills.
SPEEDS—4 and reverse.
DRIVE—Chain.
WHEEL BASE—117 inches.
TREAD—56 inches.
WEIGHT—2,700 pounds.



Hotchkiss. Model Type J. 36 M.P. Archer & Co., New York, N. Y.

PRICE—$6,500 chassis, $7,500 complete.
BODY—Double side entrance.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed nickel steel.
BRAKES—Two.
TIRES—875 x 105, 880 x 120 m.m.
CYLINDERS—4, 105 x 120 m.m.
COOLING—Water, gear pump.
IGNITION—Magneto.
CLUTCH—Cone with universal joint.
TRANSMISSION—Double sliding gears.
SPEEDS—4.
DRIVE—Shaft.
WHEEL BASE—120 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Spyker. 20-24 M.P. Central Park Automobile Storage Co. New York, N. Y.

PRICE—$5,000.
BODY—Side entrance, touring.
SEATING CAPACITY—Six persons.
FRAME—Armored wood.
BRAKES—On differential, 2 internal expanding on rear wheels.
TIRES—870 x 100 m.m.
CYLINDERS—4, in pairs.
COOLING—Water.
IGNITION—Jump spark magneto.
TRANSMISSION—Sliding.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,300 pounds.



English Daimler. 30-40 M. P. English Daimler Co., New York

PRICE FOR CHASSIS—$6,750.
BODY—Touring.
SEATING CAPACITY—Five persons.
FRAME—Straight steel plates, combined with wood and channel steel.
BRAKES—4 external on rear wheels and cross shaft.
TIRES—5 inches.
CYLINDERS—4 vertical, in pairs.
COOLING—Water, tubular radiator.
IGNITION—High tension and low tension.
CLUTCH—Leather faced cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—104 inches.
TREAD—54 inches.
WEIGHT—2,200 pounds.

Delaunay Belleville. 20 M.P. Palais de L'Automobile New York

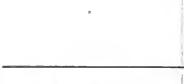
BODY—To order.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Foot and hand.
TIRES—875 x 800 m.m.
CYLINDERS—4, horizontally arranged.
COOLING—Water, gear pump and fan.
IGNITION—Make and break magneto.
CLUTCH—Friction cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse
DRIVE—Chain.
WHEEL BASE—115⅞ inches.
TREAD—Front, 55.38; rear, 53.82 inches.

Berliet, 22, 40 and 60 M. P. Mendel, Dale & Co., New York, N. Y.

BODY—Imported to order.
SEATING CAPACITY—Seven persons.
FRAME—Nickel steel.
BRAKES—2 on countershaft, 2 internal expanding on rear wheels.
TIRES—875 x 105; 920 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Centrifugal pump; fan in flywheel.
IGNITION—Make and break; Simms-Bosch low tension magneto.
TRANSMISSION—Sliding gear.
CLUTCH—Tapered finger, metal in oil.
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—116 inches.
TREAD—56 inches.
WEIGHT—2,800 pounds.

Panhard. 15, 18, 24, 35 and 40 M. P. Smith & Mabley, Inc., New York

PRICE—According to power.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Armored wood, steel, reinforced.
BRAKES—On differential and rear wheels.
TIRES—910 x 90.
CYLINDERS—4, upright, individual.
COOLING—Centrifugal pump, cooler and fan.
IGNITION—Jump spark, battery and magneto.
CLUTCH—Leather, low m.p., steel discs, higher power.
TRANSMISSION—Sliding gears.
SPEEDS—4, forward and reverse.
DRIVE—Double chain on rear wheels
WHEEL BASE—100 to 125 inches, according to m.p.
TREAD—54 and 56 inches.
WEIGHT—According to m.p.



Renault. 10-14, 14-20, 20-30 and 35-45 M.P. Renault Freres Agency New York

PRICE—According to power.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—On driving shaft and rear wheels.
TIRES—910 by 90 m.m.
CYLINDERS, 4, upright, individual.
COOLING—Centrifugal pump, cooler and fan.
IGNITION—Jump spark, battery and magneto.
CLUTCH—Cone, leather faced.
TRANSMISSION—Sliding and rolling gears.
SPEEDS—3, forward and reverse.
DRIVE—Direct bevel gear to rear live axle
WHEEL BASE—According to length of chassis.
TREAD—54 inches.
WEIGHT—1,800 to 2,000 pounds

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Decauville. 24-28 M.P.

Decauville Automobile Co.
New York, N. Y.

BODY—Optional.
SEATING CAPACITY—According to body.
FRAME—Pressed steel.
BRAKES—2 sets, double action
TIRES—880 x 120 m.m.
CYLINDERS—115 x 115 m.m.
COOLING—Honeycomb radiator with fan

IGNITION—High tension magneto and batteries.
CLUTCH—Leather cone.
TRANSMISSION—Sliding gear.
SPEEDS—4 and reverse.
DRIVE—Shaft.
WHEEL BASE—106 and 116 inches.
TREAD—57 inches

Decauville. 30-35 M.P.

Decauville Automobile Co.
New York, N. Y.

BODY—Optional.
SEATING CAPACITY—According to body.
FRAME—Pressed steel.
BRAKES—2 sets of double action
TIRES—920 x 120 m.m.
CYLINDERS—128 x 130 m.m.
COOLING—Honeycomb radiator with fan.

IGNITION—High tension magneto and batteries.
CLUTCH—Leather cone.
TRANSMISSION—Sliding gear.
SPEEDS—4 and reverse.
DRIVE—Double chain.
WHEEL BASE—110 and 120 inches.
TREAD—57 inches.



Decauville. 12-16 M.P.

Decauville Automobile Co.
New York, N. Y.

BODY—Optional.
SEATING CAPACITY—Five persons
FRAME—Pressed steel with pan.
BRAKES—2 sets double acting.
TIRES—875 x 105 m.m.
CYLINDERS—90 x 105 m.m.
COOLING—Honeycomb radiator with fan.

IGNITION—Jump spark with accumulator.
CLUTCH—Leather cone.
TRANSMISSION—Sliding gear.
SPEEDS—3 and reverse.
DRIVE—Shaft
WHEEL BASE—96 inches.
TREAD—56 inches.

Decauville. 45-60 M.P.

Decauville Automobile Co., New York

BODY—Optional.
SEATING CAPACITY—According to body.
FRAME—Pressed steel.
BRAKES—2 sets double action
TIRES—920 x 120 m.m.
CYLINDERS—140 x 150
COOLING—Honeycomb radiator with fan.

IGNITION—High tension magneto and batteries.
CLUTCH—Leather cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse
DRIVE—Double chain
WHEEL BASE—115 and 120 inches.
TREAD—57 inches.



Decauville. 16-20 M.P.

Decauville Automobile Co., New York

BODY—Optional.
SEATING CAPACITY—According to body.
FRAME—Pressed steel.
BRAKES—2 sets of double-action brakes.
TIRES—875 x 105 m.m.
CYLINDERS—98 x 105 m.m.
COOLING—Honeycomb radiator with fan.

IGNITION—High tension magneto and batteries, 2 sets.
CLUTCH—Leather cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Shaft.
WHEEL BASE—110 inches
TREAD—56½ inches.



Darracq. 20-32 M.P.

F. A. La Roche Company, New York

BODY—Double phaeton tulip, side entrances (also Limousine and demi-Limousine).
SEATING CAPACITY—Five persons.
FRAME—Pressed steel, special patent.
BRAKES—Internal expansion on cardan shaft and rear wheels.
TIRES—Front, 870 x 90; rear, 880 x 120 m.m.
CYLINDERS—4, 112 m.m. bore, 120 m.m. stroke, vertical, in pairs
COOLING—Water.

IGNITION—High tension by coil and accumulator, or Simms-Bosch magneto.
CLUTCH—Cone type.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear, cardan shaft and live axle.
WHEEL BASE—120 inches.
TREAD—52 inches.
WEIGHT—2,300 pounds.



Darracq. 40 M.P.

F. A. La Roche Company, New York

BODY—Double phaeton tulip, side entrances.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel, special patent.
BRAKES—Internal expansion, on cardan shaft and rear wheels.
TIRES—Front, 880 x 120; rear, 880 x 120 m.m.
CYLINDERS—4, 130 m.m. bore and stroke.
COOLING—Water.

IGNITION—Simms-Bosch magneto.
CLUTCH—Cone type.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear, cardan shaft and live axle.
WHEEL BASE—125 inches.
TREAD—53 inches
WEIGHT—2,700 pounds.

Humber. Model, Beeston Humber 16-20 M.P.

Humber, Limited
Beeston, (Notts.) England

BODY—Double phaeton, side entrance, Roi des Belges.
SEATING CAPACITY—Five persons
FRAME—Pressed steel.
BRAKES—On driving shaft and rear wheels.
TIRES—815 x 100 m.m.
CYLINDERS—10 separate, 95 x 125 m.m.
COOLING—Water, rotary pump.

IGNITION—High tension magneto and accumulator
CLUTCH—Aluminum, leather covered.
TRANSMISSION—Sliding gear.
SPEEDS—4 forward and reverse.
DRIVE—Shaft
WHEEL BASE—102 inches.
TREAD—58 inches
WEIGHT—1,540 pounds.

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Richard-Brasier. Models, 15-20, 25-36, 40-60 M. P.

PRICE—$5,500 to $11,500.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Nickel steel.
BRAKES—Internal and external.
TIRES—Front, 870 x 105; rear, 880 x 120 m.m.
CYLINDERS—4, in pairs.
COOLING—Thermo-siphon.

E. B. Gallaher, New York, N. Y.

IGNITION—Simms Bosch low tension magneto, make and break.
CLUTCH—Cone.
TRANSMISSION—Cush gears.
SPEEDS—4, ahead and reverse.
DRIVE—15-20 m.p.; shaft, 25-36 m.p. and 40-60 m.p. chain.
WHEEL BASE—2 lengths for each model.
TREAD—56 inches.
WEIGHT—1,800-2,800 pounds, chassis only.



Clement-Bayard. 24 M. P.

PRICE—$5,750.
BODY—King of Belgium.
SEATING CAPACITY—Five persons.
BRAKES—Internal expansion on rear wheels.
CYLINDERS—4, separate.
COOLING—Honeycomb with fan.

Sidney B. Bowman Automobile Co., New York, N. Y.

IGNITION—High tension magneto.
CLUTCH—Cone, detachable.
SPEEDS—4, forward and reverse.
DRIVE—Bevel gear, live axle.
WHEEL BASE—110 inches.
TREAD—56 inches.
WEIGHT—2,500 pounds.

Delaunay Belleville. 24 M. P.

PRICE—$6,000.
BODY—To order.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Foot and hand.
CYLINDERS—4, horizontally arranged.
COOLING—Water, gear pump and fan.

Palais de L'Automobile, New York, N. Y.

IGNITION—Make and break magneto
CLUTCH—Friction cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—118½ inches.
TREAD—Front, 56.55; rear, 55.77 inches.



Leon Bollee. 20-40 M. P.

PRICE—20 m.p. chassis, $6,000; 40 m.p. chassis, $9,000.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—3.
TIRES—Front, 915 x 105; rear, 920 x 120 m.m.
CYLINDERS—4, arranged 1, 2, 4, 3.
COOLING—Water.

Cryder & Co., New York, N. Y.

IGNITION—Battery and high tension magneto, Simms Bosch.
CLUTCH—Leather cone.
TRANSMISSION—Mercedes type.
SPEEDS—4 forward and reverse.
DRIVE—Chain.
WHEEL BASE—Chassis in two sizes, 2 m. 20 and 2 m. 82.
TREAD—56 inches.
WEIGHT—20 m.p. 2,000 and 40 m.p. 2,500 pounds.



Delaunay Belleville. 40 M. P.

PRICE—$7,500.
BODY—To order.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Foot and hand.
CYLINDERS—4, horizontally arranged.
COOLING—Water, gear pump and fan.

Palais de L' Automobile, New York, N. Y.

IGNITION—Make and break magneto.
CLUTCH—Friction cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—122 inches.
TREAD—Front, 56.55; rear, 55.77 inches.



Mercedes. 35 and 45 M. P.

PRICE—Chassis 35 M.p., $8,400; 45 m.p., $10,150.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—On differential shaft and countershaft, on wheels.
TIRES—910 x 90; 920 x 120 m.m.
CYLINDERS—4, upright, in pairs.
COOLING—Centrifugal pump, cooler and fan.

Smith & Mabley, Inc., New York, N. Y.

IGNITION—Make and break magneto.
CLUTCH—Constricting spring.
TRANSMISSION—Sliding gear.
SPEEDS—4 forward and reverse.
DRIVE—Double chain.
WHEEL BASE—133 inches.
TREAD—56 inches.
WEIGHT—2,100 pounds.



Clement-Bayard. 45 M. P.

PRICE—$8,750.
BODY—Double side entrance, King of Belgium.
SEATING CAPACITY—Five persons.
BRAKES—Internal expansion on rear wheels.
TIRES—Front, 915 x 105; rear, 920 x 120 m.m.
CYLINDERS—4, separate.
COOLING—Centrifugal water pump.

Sidney B. Bowman Automobile Co. New York, N. Y.

IGNITION—High tension magneto.
CLUTCH—Cone, detachable.
TRANSMISSION—Direct on high.
SPEEDS—4, forward and reverse.
DRIVE—Chains.
WHEEL BASE—115 inches.
TREAD—56 inches.
WEIGHT—3,100 pounds.



Napier. Model Nike, 18 M. P. Napier Motor Co. of America, Boston, Mass.

PRICE—With top, $2,250.
BODY—Wood, runabout type.
SEATING CAPACITY—Two persons.
FRAME—Angle steel.
BRAKES—Service, emergency.
TIRES—32 x 3½.
CYLINDERS—4, in pairs, vertical.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Metal to metal.
TRANSMISSION—Sliding gears.
SPEEDS—3, forward and reverse.
DRIVE—Propeller shaft.
WHEEL BASE—90 inches.
TREAD—56¼ inches.
WEIGHT—1,600 pounds.

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Mors. 24-32 M. P. — Mors Automobile Co., New York, N. Y.

PRICE—$9,000.
BODY—Limousine.
SEATING CAPACITY—Eight persons.
FRAME—Pressed steel.
BRAKES—Four internal expansion.
TIRES—Front, 910 x 90; rear, 920 x 120 m.m.
CYLINDERS—4, vertical, separate.
COOLING—Water pump.

IGNITION—Magneto make and break, low tension.
CLUTCH—Metal to metal.
TRANSMISSION—Sliding gear direct on fourth gear.
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—116 inches.
TREAD—56 inches.
WEIGHT—2,900 pounds.



Rochet-Schneider. 30 M. P. — Auto Import Co., New York, N. Y.

PRICE—$9,000.
BODY—To suit.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—4.
TIRES—920 x 120 m.m.
CYLINDERS—4, 120 x 120 m.m.
COOLING—Water, fan, radiator.

IGNITION—Magneto, low tension make and break.
CLUTCH—Patent metallic.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—127 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Napier. Model D 50, 45 M. P. — Napier Motor Co. of America, Boston, Mass.

PRICE—$6,000; Imported, $10,000.
BODY—Aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Service, emergency.
TIRES—Front, 870 x 90; rear 850 x 120 mm.
CYLINDERS—4, in pairs, vertical.
COOLING—Water.

IGNITION—Single coil, synchronized jump spark.
CLUTCH—Metal to metal.
TRANSMISSION—Sliding gears.
SPEEDS—3 forward and reverse.
DRIVE—Propeller shaft.
WHEEL BASE—109 inches.
TREAD—54 inches.
WEIGHT—2,800 pounds.



Panhard. Model Touring, 50 M. P. — Panhard & Levassor, New York, N. Y.

PRICE—$11,250, complete.
BODY—Double phaeton with hood and curtains.
SEATING CAPACITY—Seven persons.
FRAME—Armored wood.
BRAKES—Differential, expansion.
TIRES—36 x 5 x 36½ x 5½.
CYLINDERS—4, separated, vertical.
COOLING—Honeycomb radiator.

IGNITION—Battery and magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—4, ahead and reverse, on one lever.
DRIVE—Double chain.
WHEEL BASE—125⅝ inches.
TREAD—56 inches.
WEIGHT—3,200 pounds.



Panhard. Model Pleasure, 24 M. P. — Panhard & Levassor, New York, N. Y.

PRICE—$8,000 complete.
BODY—Grand Limousine.
SEATING CAPACITY—Seven persons.
FRAME—Armored wood.
BRAKES—Differential, expansion.
TIRES—36 x 5 in.
CYLINDERS—4, separated, vertical.
COOLING—Honeycomb radiator.

IGNITION—Battery and magneto.
CLUTCH—Steel.
TRANSMISSION—Sliding gear.
SPEEDS—4 forward and reverse.
DRIVE—Chain.
WHEEL BASE—117⅝ inches.
TREAD—56 inches.
WEIGHT—2,950 pounds.



Gallia. Model, Galliette. — Gallia Electric Carriages, New York, N. Y.

PRICE—$2,500.
BODY—Galliette.
SEATING CAPACITY—Two or three persons.
FRAME—U-iron.
BRAKES—Two mechanical.
TIRES—Michelin.
MOTOR—Single.

BATTERY—Ajaga, divided.
CAPACITY—55 to 62 miles.
SPEEDS—2, forward and reverse.
DRIVE—Cardan shaft.
WHEEL BASE—6½ feet.
TREAD—4½ feet.
WEIGHT—2,500 pounds.



Züst. Model, 40-50 M. P. — R. Bertelli & Co., New York, N. Y.

PRICE—$8,500.
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—One-piece cold pressed steel.
BRAKES—Internal, expanding on rear hubs and double-acting.
TIRES—Front, 870 x 90; rear, 885 x 105 m.m.
CYLINDERS—4, in pairs.
COOLING—Water.

IGNITION—Simms-Bosch low-tension magneto, make and break.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—118 inches.
TREAD—58 inches.
WEIGHT—1,800 pounds.



Rochet-Schneider. 40 M. P. — Auto Import Co., New York, N. Y.

PRICE—$11,000.
BODY—To suit.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—4.
TIRES—920 x 126, 935 x 135 m.m.
CYLINDERS—4, 140 x 140 m.m.
COOLING—Water.

IGNITION—Magneto, low tension make and break.
CLUTCH—Metallic.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Chain.
WHEEL BASE—118 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

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Gallia. — Gallia Electric Carriages, New York, N. Y.

PRICE—$5,000.
BODY—Landaulet.
SEATING CAPACITY—Two or four.
FRAME—Steel plate and Z angle iron.
BRAKES—S, electric and mechanical.
TIRES—Michelin.
MOTORS—Compound.

BATTERY—Ajapa; capacity 240 to 250 ampere hours.
TRANSMISSION—Pinion, circular rack.
SPEEDS—2½ to 19 miles per hour, 8 speeds and reverse.
DRIVE—Rear wheel direct.
WHEEL BASE—7½ feet.
TREAD—5¼ feet.
WEIGHT—4,000 pounds.



De Dietrich. 12-16, 24-40 and 60 M. P. — De Dietrich Importing Co., New York City

PRICE—
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Pressed steel.
BRAKES—Metallic.
TIRES—
CYLINDERS—4 in pairs.
COOLING—Air and water.

IGNITION—Make and break, low tension Simms-Bosch magneto.
CLUTCH—Leather-faced cone.
TRANSMISSION—Sliding gear.
SPEEDS—4 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—
TREAD—
WEIGHT—

C. G. V. 14 M. P. — Em. Voigt, New York City

PRICE—
BODY—Coupé.
SEATING CAPACITY—Four persons.
FRAME—Curved.
BRAKES—Internal expanding on differential and rear wheels.
TIRES—815 x 105 m.m.
CYLINDERS—4, 90 x 110 m.m.
COOLING—Flanged radiator, circulation of water.

IGNITION—Simms-Bosch magneto with spark plugs and accumulator.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—4 and reverse.
DRIVE—Shaft.
WHEEL BASE—114 inches.
TREAD—56 inches.

C. G. V. 20-30 and 50 M. P. — Em. Voigt, New York City



PRICE—
BODY—Optional.
SEATING CAPACITY—Five to seven persons.
FRAME—Armored wood, square.
BRAKES—Internal expansion on differential and rear wheels.
TIRES—
CYLINDERS—4 $\frac{A}{815}$ $\frac{A}{105}$ TIRES $\frac{B}{875}$ $\frac{B}{120}$ TIRES $\frac{AB}{140 \times 140}$ m. m.
COOLING—Water gear pump.

IGNITION—Magneto and accumulators.
CLUTCH—Leather-faced cone.
TRANSMISSION—sliding gear.
SPEEDS—4 forward, 1 reverse.
DRIVE—Chain.
WHEEL BASE—
TREAD—
WEIGHT—



Viqueot. 40-45 M. P. — Viqueot Co., New York City

PRICE—$7,500.
BODY—Latest foreign design.
SEATING CAPACITY—Seven persons.
FRAME—Pressed steel.
BRAKES—Internal expansion.
TIRES—34 x 4½ inches.
CYLINDERS—4.
COOLING—Water.

IGNITION—Double system battery and Eiseman.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—4, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—119 inches.
TREAD—56 inches.

Viqueot. 28-32 M. P. — Viqueot Co., New York City

PRICE—$5,000.
BODY—Latest foreign design.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—Internal expansion.
TIRES—34 x 4½.
CYLINDERS—4.
COOLING—Water.

IGNITION—Battery and Eiseman magneto.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—119 inches.
TREAD—56 inches.
WEIGHT—

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STEAM CARS

White. Model Touring, 18 M. P. White Sewing Machine Co., Cleveland, O.



PRICE—$2,800. Cape top $150 extra.
BODY—Side entrance.
SEATING CAPACITY—Five persons.
FRAME—Armored wood.
BRAKES—Foot-brake expanding in flywheel, hand-brake expanding in rear wheel.
TIRES—34 x 4.
CYLINDERS—2 compound, vertical, under bonnet.
COOLING—Condenser.

GENERATOR—Flash, 11 helical coils of tubing
BURNER—Enclosed gasoline.
TRANSMISSION—Direct drive
SPEEDS—All speeds.
DRIVE—Shaft.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,260 pounds.

White. Model Runabout, 18 M. P. White Sewing Machine Co., Cleveland, O.



PRICE—$2,500.
BODY—Runabout.
SEATING CAPACITY—Two persons.
FRAME—Armored wood.
BRAKES—Foot-brake expanding in flywheel, hand-brake expanding in rear wheel.
TIRES—34 x 4.
CYLINDERS—2, compound, vertical, under bonnet.
COOLING—Condenser.

GENERATION—Flash, 11 helical coils of tubing
BURNER—Enclosed gasoline.
TRANSMISSION—Direct drive.
SPEEDS—All speeds.
DRIVE—Shaft.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,260 pounds.

White. Model Victoria, 18 M. P. White Sewing Machine Co., Cleveland, O.



PRICE—$3,800.
BODY—Side entrance Victoria.
SEATING CAPACITY—Five persons.
FRAME—Armored wood.
BRAKES—Foot-brake expanding in flywheel, hand brake expanding in rear wheel.
TIRES—34 x 4.
CYLINDERS—2 compound, vertical, under bonnet.
COOLING—Condenser.

GENERATOR—Flash, 11 helical coils of tubing
BURNER—Enclosed gasoline.
TRANSMISSION—Direct drive.
SPEEDS—All speeds.
DRIVE—Shaft.
WHEEL BASE—114 inches.
TREAD—56 inches.
WEIGHT—2,260 pounds.

White. Model Limousine, 18 M. P. White Sewing Machine Co., Cleveland, O.



PRICE—$3,600.
BODY—Side entrance Limousine.
SEATING CAPACITY—Seven persons.
FRAME—Armored wood.
BRAKES—Foot-brake expanding in flywheel, hand-brake expanding in rear wheel.
TIRES—34 x 4.
CYLINDERS—2, compound, vertical, under bonnet.
COOLING—Condenser.

GENERATOR—Flash—11 helical coils of tubing.
BURNER—Enclosed gasoline.
TRANSMISSION—Direct drive.
SPEEDS—All speeds.
DRIVE—Shaft.
WHEEL—Base 114 inches.
TREAD—56 inches.
WEIGHT—2,260 pounds.

White. Model Landaulette, 18 M. P. White Sewing Machine Co., Cleveland, O.



PRICE—$2,800
BODY—Side entrance, landaulet.
SEATING CAPACITY—Five persons.
FRAME—Armored wood.
BRAKES—Foot-brake expanding in flywheel.
TIRES—34 x 4.
CYLINDERS—2, compound, vertical, under bonnet.
COOLING—Condenser.

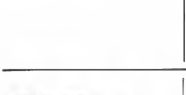
GENERATOR—Flash, 11 helical coils of tubing
BURNER—Enclosed gasoline.
TRANSMISSION—Direct drive.
SPEEDS—All speeds.
DRIVE—Shaft.
WHEEL BASE—114 inches.
TREAD—56 inches
WEIGHT—2,260 pounds.

Chicago. Model C. 25 M. P. Chicago Automobile Mfg. Co. Chicago, Ill.

PRICE—$2,500.
BODY—Laminated wood, King of Belgium.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On driving shaft, compensating internal, expanding on rear hubs.
TIRES—Front, 32 x 4, plain; rear, 32 x 4, Bailey tread.
CYLINDERS—4, in pairs, 45 deg angle, single acting
COOLING—Condenser, with spiral tubing.

GENERATOR—Flash and water tube, closed bottom burner, wind proof.
CLUTCH—Straight cutout.
TRANSMISSION—Direct drive on high speed; low speed through gear, 6 to 1.
DRIVE—Shaft.
WHEEL BASE—112 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.

Stanley. Ex, 10 M. P. Stanley Motor Carriage Co., Newton, Mass.



PRICE—$850.
BODY—Runabout, sliding rear seat.
SEATING CAPACITY—Four persons.
FRAME—Tubular.
BRAKES—2 double acting on rear driving shaft.
TIRES—30 x 3.
CYLINDERS—2 double acting horizontal.

DRIVE—Direct spur gear.
WHEEL BASE—90 inches.
TREAD—54 inches.
WEIGHT—1,100 pounds.

Stanley. Model F, 15 M.P. Stanley Motor Car. Co., Newton, Mass.



PRICE—$1,500.
BODY—Wood, side entrance.
SEATING CAPACITY—Five persons.
FRAME—Tubular.
BRAKES—Internal, expanding on hub.
TIRES—34 x 3½.
CYLINDERS—2 double acting horizontal.

DRIVE—Spur gear direct to rear axle.
WHEEL BASE—100 inches.
TREAD—54 inches.
WEIGHT—1,800 pounds.

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Baker.
Interior Driven Brougham

PRICE—$3,500.
BODY—Brougham.
SEATING CAPACITY—Four persons.
BRAKES—2.
TIRES—36 x 3½ x 4½.

Baker Motor Vehicle Co.,
Cleveland, O.

DRIVE—Bevel gear.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Baker,
Exterior Rear Driven Brougham

PRICE—$4,000.
BODY—Brougham.
SEATING CAPACITY—Four persons.
BRAKES—2.
TIRES—36 x 3½ x 4½.

Baker Motor Vehicle Co.,
Cleveland, O.

DRIVE—Bevel gear.
WHEEL BASE—86½ inches.
TREAD—56 inches.
WEIGHT—2,950 pounds.



Baker. Depot Carriage.

PRICE—$3,000.
SEATING CAPACITY—Four persons.
BRAKES—2.
TIRES—36 x 4½.

Baker Motor Vehicle Co.,
Cleveland, O.

DRIVE—Bevel gear.
WHEEL BASE—92½ inches.
TREAD—56 inches.
WEIGHT—2,375 pounds.



Baker. Stanhope.

PRICE—$1,600.
BODY—Stanhope.
SEATING CAPACITY—Two persons.
BRAKES—2.
TIRES—30 x 3.

Baker Motor Vehicle Co.,
Cleveland, O.

DRIVE—Chain.
WHEEL BASE—68 inches.
TREAD—48½ inches.
WEIGHT—1,050 pounds.



Baker. Imperial Runabout.

PRICE—$1,200.
BODY—Imperial runabout.
SEATING CAPACITY—2 persons.
BRAKES—2.
TIRES—30 x 3.

Baker Motor Vehicle Co., Cleveland, O.

DRIVE—Chain.
WHEEL BASE—68 inches.
TREAD—48½ inches.
WEIGHT—1,000 pounds.



Baker. Suburban,
2½ M. P.

PRICE—$2,000.
BODY—Suburban.
SEATING CAPACITY—2 persons.
BRAKES—2.
TIRES—34 x 3½.

Baker Motor Vehicle Co.,
Cleveland, O.

DRIVE—Bevel gear.
WHEEL BASE—82 inches.
TREAD—55⅝ inches.
WEIGHT—1,750 pounds.



Cantono. Brougham,
5 M. P.

PRICE—$3,100.
BODY—Extension brougham.
SEATING CAPACITY—Four persons.
BRAKES—2 electrical, 1 mechanical.
TIRES—Front 2½ inches, rear 1½ inches.
MOTORS—2, compound, 2½ m.p. each.

Cantono Electric Tractor Co.,
New York, N. Y.

BATTERIES—112 A. H.
STEERING—Electrical and mechanical.
SPEEDS—6 to 15 miles per hour.
DRIVE—Direct.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.



Cantono. Victoria,
5 M. P.

PRICE—$2,900.
BODY—Victoria.
SEATING CAPACITY—Three persons.
BRAKES—2 electric, 1 mechanical.
TIRES—Front, 2½ x 1½ inches.
MOTORS—2, compound, 2½ m.p. each.

Cantono Electric Tractor Co.
New York, N. Y.

BATTERIES—112 A. H.
STEERING—Electrical and mechanical.
SPEEDS—6 to 15 miles per hour.
DRIVE—Direct.
WHEEL BASE—84 inches.
TREAD—56 inches.
WEIGHT—3,000 pounds.

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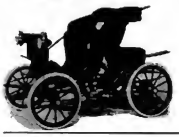


Rauch and Lang Stanhope, 1-8 M. P.

PRICE—$1,800.
BODY—Stanhope.
SEATING CAPACITY—Two persons.
FRAME—Steel.
BRAKES—Motor, expansion on rear wheels, electric emergency.
TIRES—32 x —
MOTOR—1 m.p.; 8 m.p., overload.

Rauch and Lang Carriage Co., Cleveland, O.

BATTERY—Capacity 24 cells, 108 ampere hour.
SPEEDS—10, 13, 16, 19 miles per hour.
DRIVE—Double chain
WEIGHT—1,900 pounds.



Buffalo. Model 3. Buffalo Electric Carriage Co., Buffalo, N. Y.

PRICE—$2,000.
TIRES—2-inch front, 2½ inch back; solid.

BATTERIES—40 cells, 13 plates; 48 cells, 11 plates.
SPEEDS—18 to 20 miles per hour, 50 miles on one charge.
WHEEL BASE—66 inches.



Columbus, 1 1-2 M. P.

PRICE—$1,600.
BODY—Stanhope.
SEATING CAPACITY—Two persons.
FRAME—Pressed steel.
BRAKES—1 expanding on rear hubs; by controller handle on motor shaft.
TIRES—30 x 3.
MOTOR—1½ m.p.

Columbus Buggy Co., Columbus, O.

SPEEDS—3½, 7, 13½, 20 miles per hour.
DRIVE—Double chain.
WHEEL BASE—67 inches.
TREAD—52 inches.
WEIGHT—1,500 pounds.



Columbus, 2 1-2 M. P.

PRICE—$1,500.
SEATING CAPACITY—Four persons.
FRAME—Pressed steel.
BRAKES—1 expansion and on rear wheels.
TIRES—34 x 4.
MOTOR—2½ m.p.

Columbus Buggy Co., Columbus, O.

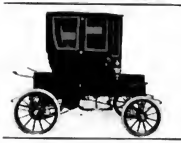
SPEEDS—3½, 7, 12½ and 16 miles per hour.
DRIVE—Double chain.
WHEEL BASE—87 inches.
TREAD—56 inches.
WEIGHT—2,200 pounds.



Woods. Broughm. Woods Motor Vehicle Co., Chicago, Ill.

PRICE—$3,000.
BODY—Brougham.
SEATING CAPACITY—4, and 2 men up.
FRAME—Steel reach.
BRAKES—2 sets.
TIRES—32 x 3 and 36 x 3, solid.
MOTOR—3½ m.p., overload capacity 100 per cent.

BATTERIES—Exide, 40 cells.
SPEEDS—4, 8, 12 and 16 miles per hour.
DRIVE—Gear.
WHEEL BASE—98 inches.
TREAD—56 inches.
WEIGHT—3,500 pounds.



Woods. Victoria. Woods Motor Vehicle Co., Chicago, Ill.

PRICE—$1,900.
BODY—Victoria.
SEATING CAPACITY—Two persons.
FRAME—Wood and steel.
BRAKES—2 sets.
TIRES—Front, 30 x 2½; rear, 34 x 2½, solid.
MOTOR—3½ m.p., overload capacity 100 per cent.

BATTERIES—Exide, 40 cells.
SPEEDS—4, 8, 12 and 16 miles per hour.
DRIVE—Side chain.
WHEEL BASE—72 inches.
TREAD—54 inches.
WEIGHT—2,500 pounds.



Pope-Waverley, Model 30, Station Wagon.

PRICE—$2,250.
BODY—As shown.
BRAKES—2 foot and 1 electric.
TIRES—30 x 3½ x 4.
MOTOR—2 special, double overload capacity.

Pope Motor Car Company, Indianapolis, Ind.

BATTERIES—41 cells of 11 p.v. Exide or 41 cells of 11 c.h. National.
SPEEDS—5 to 14 miles per hour.
DRIVE—Herringbone gears.
WHEEL BASE—77½ inches.
TREAD—54 inches.



Pope Waverley, Model 29 C, Physician's Road Wagon.

PRICE—$1,250.
BODY—Straight sill, removable canopy top and glass front.
BRAKES—2 foot, 1 electric.
TIRES—30 x 3 x 3½.
MOTOR—1, double overload capacity.

Pope Motor Car Company, Indianapolis, Ind.

BATTERIES—30 cells of p.v. Exide or 30 cells of 9 c.h., National.
TRANSMISSION—Noiseless herringbone gear.
SPEEDS—5 to 16 miles per hour.
WHEEL BASE—72 inches.
TREAD—54 inches.

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Pope-Waverley. Model 65, Stanhope

Pope Motor Car Co., Indianapolis, Ind.

PRICE—$1,400.
BODY—Straight sill.
BRAKES—2 foot, 1 electric.
TIRES—30 x 3 x 3½.
MOTOR—1, double overload capacity.

BATTERIES—30 cells of 11 p.v. Exide or 30 cells of 11 c.h. National.
WHEEL BASE—70 inches.
TREAD—54 inches.
WEIGHT—



Pope-Waverley. Model 26 Chelsea,

Pope Motor Car Co., Indianapolis Ind.

PRICE—$1,200.
BODY—Straight sill, swelled panels.
BRAKES—2 foot, 1 electric.
TIRES—30 x 3 x 3½.
MOTOR—1, double overload capacity.

BATTERY—30 cells 9 p.v. Exide, or 30 cells of 9 c.h. National.
TRANSMISSION—
SPEEDS—5 to 16 miles per hour.
WHEEL BASE—80 inches.
TREAD—54 inches.



Pope-Waverly. Model 60 B, Surrey

Pope Motor Car Co., Indianapolis, Ind.

PRICE—$1,700.
BODY—Straight sill, panel seat.
BRAKES—2 foot, 1 electric.
TIRES—30 x 3½ x 4.
MOTORS—2, of double overload capacity.

BATTERY—42 cells of 9 p.v. Exide, or 42 cells of 9 c.h. National.
TRANSMISSION—Noiseless herringbone.
SPEEDS—5 to 15 miles per hour.
WHEEL BASE—90 inches.
TREAD—54 inches.

Pope-Waverley. Model 53, Stanhope Special

Pope Motor Car Co., Indianapolis, Ind.

PRICE—$2,000.
BODY—Straight sill, swelled panels.
BRAKES—2 foot, 1 electric.
TIRES—32 x 3½ x 4.
MOTOR—1, double overload capacity.

BATTERY—30 cells 11 m.v. Exide, divided between front and rear compartments, or 30 cells 11 w.h. National.
TRANSMISSION—Noiseless herringbone.
SPEEDS—5 to 18 miles per hour.
WHEEL BASE—76 inches.
TREAD—54 inches.



V. E. Co. Victoria

Vehicle Equipment Co., Long Island City, N. Y.

BODY—Wood, rear boot, with top.
SEATING CAPACITY—Three persons.
BRAKE—1 foot, 1 electric.
TIRES—3 x 36 x 3½ x 42. Firestone.

SPEEDS—2 ahead, 2 reverse.
DRIVE—Gear.
WHEEL BASE—93⅝ inches.
TREAD—53⅝ inches.

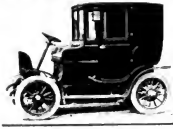


V. E. Co., Brougham.

Vehicle Equipment Co., Long Island City, N. Y.

BODY—Wood, extension front.
SEATING CAPACITY—Four persons.
FRAME—Rocker.
BRAKES—1 foot, 1 electric.
TIRES—36 x 3 x 42 x 3½. Firestone.

SPEEDS—4 ahead, 2 reverse.
DRIVE—Gear.
WHEEL BASE—84½ inches.
TREAD—56 inches.



Columbia, Model, LXVIII.

Electric Vehicle Co., Hartford, Conn.

PRICE—$4,000.
BODY—Extension front brougham; option, Landaulet, Limousin and Victoria bodies.
SEATING CAPACITY—Inside seats four persons.
FRAME—Pressed steel.
BRAKES—Internal and external, rear hubs.
TIRES—32 x 4 x 4½ pneumatic.
MOTOR—80 v. 55 amp.
BATTERY—13 m.v. Exide special, 44 cells underslung.

CAPACITY—168 ampere hours at 42 amperes.
TRANSMISSION—Double gear, silent helical.
SPEEDS—5 forward, 3 backward.
RADIUS—40 miles per charge.
WHEEL BASE—86 inches.
TREAD—52 inches.
WEIGHT—4,400 pounds.

Parsons. Stanhope, 8 M. P.

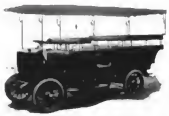
Parsons Electric Motor Carriage Co., Cleveland, O.

PRICE—$1,600.
BODY—Stanhope, 3-bow caleche top.
SEATING CAPACITY—2 persons.
FRAME—Combined wood and steel springboard.
BRAKES—Motor only.
TIRES—30 x 3½.

SPEEDS—Four.
DRIVE—Double chain to rear wheels.
WHEEL BASE—66 inches.
TREAD—46 inches.
WEIGHT—900 pounds.

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BUSINESS WAGONS



Olds Wagonette, 16 M. P. — Olds Motor Works, Lansing, Mich.

PRICE—$2,250.
BODY—Wood, wagonette type.
SEATING CAPACITY—Eighteen persons.
FRAME—Pressed steel.
BRAKES—Transmission and internal hub.
TIRES—34 x 4.
CYLINDERS—2 vertical, under seat.
COOLING—Water, gear pump, radiator front of dash.

IGNITION—Jump spark, dry cells storage battery.
TRANSMISSION—Planetary, on countershaft.
SPEEDS—2 forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—110 inches.
TREAD—55 inches.
WEIGHT—3,000 pounds.



Oldsmobile Delivery Wagon, 16 M. P. — Olds Motor Works, Lansing, Mich.

PRICE—$2,350.
BODY—Wood, delivery, to order.
CAPACITY—3,500 pounds.
FRAME—Pressed steel.
BRAKES—Transmission and internal hub.
TIRES—34 x 4.
CYLINDERS—2 vertical under seat.
COOLING—Water, gear pump, radiator front of dash.

IGNITION—Jump spark, dry cells, storage battery.
TRANSMISSION—Planetary, on countershaft.
SPEEDS—2 forward and reverse.
DRIVE—Double side chain.
WHEEL BASE—110 inches.
TREAD—55 inches.
WEIGHT—3,000 pounds.



Soules Light Delivery Wagon — Soules Motor Car Co., Grand Rapids, Mich.

PRICE—$1,500.
BODY—Open, with detachable top, or closed with wire side panels.
CAPACITY—1,500 pounds.
FRAME—Angle steel.
BRAKES—Internal and external rear hub.
TIRES—32 x 3, or 34 x 2½.
CYLINDERS—2, horizontal opposed, in front, 5½ x 5.
COOLING—Water, thermo-siphon system.

IGNITION—Jump spark, double coil.
CLUTCH—Cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—2,000 pounds.



Maxwell, Model P, Truck, 16 M. P. — Maxwell-Briscoe Motor Co., Tarrytown, N. Y.

BODY—Wood.
CAPACITY—Two person; 3,000 to 4,000 pounds.
FRAME—Pressed steel.
BRAKES—4, operating directly on rear wheels.
TIRES—32 x 3½; 32 x 4.
CYLINDERS—2, double opposed.
COOLING—Thermo-siphon.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—85 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.



Packard. Truck, 14 M. P. — Packard Motor Car Co., Detroit, Mich.

PRICE—Chassis, $2,500.
BODY—Optional for freight or passenger.
SEATING CAPACITY—Eighteen persons or less.
FRAME—Armored wood.
BRAKES—4, operating directly on rear wheels.
TIRES—Front, 32 x 3½; rear, 34 x 5¼.
CYLINDERS—2, vertical, fore and aft.
COOLING—Water, positive circulation.

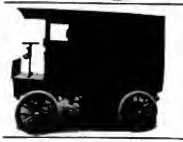
IGNITION—Storage battery.
CLUTCH—Expansion band.
TRANSMISSION—Sliding gears.
SPEEDS—3 forward and reverse.
DRIVE—Double chain.
WHEEL BASE—97 inches.
TREAD—56½ inches.
WEIGHT—3,000 pounds.



Parsons. Delivery Wagon, 8 M. P. — Parsons Electric Motor Carriage Co. Cleveland, O.

PRICE—$1,500.
BODY—Full paneled.
SEATING CAPACITY—One person and load.
FRAME—Laminated wood and iron.
BRAKES—2, motor and wheels.
TIRES—30 x 3½.

SPEEDS—6, 8 and 10 miles per hour.
DRIVE—Double chain to rear wheels.
WHEEL BASE—70 inches.
TREAD—52 inches.
WEIGHT—1,540 pounds.



Lansden. Model 57 E, 2.85 M. P. — Lansden Company, Newark, N. J.

PRICE—$2,150.
BODY—Closed panel or optional.
LOAD CAPACITY—2,000 pounds.
FRAME—Armored wood.
BRAKES—Internal expanding in hub drums.
TIRES—32 x 3, solid.
MOTOR—Single, 3.85 m.p., electric.

SPEED—10 miles per hour.
DRIVE—Chain.
WHEEL BASE—78 inches.
TREAD—56 inches.
WEIGHT—2,950 pounds.



Lansden. Model 46 A, 3.85 M. P. — Lansden Company, Newark, N. J.

PRICE—$3,100.
BODY—Open top express.
LOAD CAPACITY—4,000 pounds.
FRAME—Armored wood.
BRAKES—Internal expanding in hub drums.
TIRES—36 x 4.
MOTOR—Single, 3.85 m.p., electric.

SPEED—8 miles per hour.
DRIVE—Chains.
WHEEL BASE—111 inches.
TREAD—66 inches.
WEIGHT—4,700 pounds.

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Auto-Car. Wagonette, 35 M. P.

PRICE—$3,500.
BODY—Enclosed wagonette with removable sash, rear entrance.
SEATING CAPACITY—Sixteen persons.
FRAME—Angle iron.
BRAKES—Internal, expanding in rear hub, on transmission.
TIRES—36 x 3.
CYLINDERS—4, vertical, tandem.
COOLING—Gear driven pump, cellular cooler, fan.

Auto-Car Equipment Co., Buffalo, N. Y.

IGNITION—Jump spark, single coil and distributer.
CLUTCH—Spring cone in flywheel.
TRANSMISSION—Sliding gear.
SPEEDS—2, ahead and reverse.
DRIVE—Double chain.
WHEEL BASE—120 inches.
TREAD—56½ inches.
WEIGHT—3,500 pounds.



Auto-Car. Truck,

PRICE—$3,000.
BODY—Platform with side gates and tail gate.
LOAD CAPACITY—6,000 pounds.
FRAME—Oak armored, 7 x 3-16.
BRAKES—Internal, expanding on rear wheels.
TIRES—36 x 3½ x 4.
CYLINDERS—4, vertical, tandem.
COOLING—Gear-driven pump, cellular cooler.

Auto-Car Equipment Co., Buffalo, N.Y.

IGNITION—Jump spark, single coil and distributer.
CLUTCH—Spring cone inside flywheel.
TRANSMISSION—Sliding gear.
SPEEDS—3, ahead and reverse.
DRIVE—Double chain.
WHEEL BASE—95 inches.
TREAD—62 inches.
WEIGHT—4,880 pounds.



Auto-Car. Electric Hotel Omnibus

PRICE—$3,000.
BODY—Special omnibus type, large plate windows, drop sash.
SEATING CAPACITY—Fourteen persons.
FRAME—Oak armored with steel.
BRAKES—Internal, expanding on rear hubs.
TIRES—36 x 3½ x 4.
MOTORS—2 Westinghouse.

Auto-Car Equipment Co., Buffalo, N. Y.

BATTERY—44 cells, extde.
SPEEDS—12 miles per hour.
DRIVE—Double independent chain.
WHEEL BASE—95 inches.
TREAD—61½ inches.
WEIGHT—5,000 pounds.



Auto-Car. Passenger Electric Car

SEATING CAPACITY—Twenty four persons.
FRAME—Seasoned oak, armored with steel.
BRAKES—Double-acting internal on rear hubs.
TIRES—36 x 3½ x 4, solid.
MOTORS—Westinghouse.

Auto-Car Equipment Co., Buffalo, N. Y.

BATTERY—42 cell, 15 m.v. storage.
DRIVE—Chain drive, double independent.
LENGTH—Over all, 16 feet 4 inches; width, 48 inches.
TREAD—60 inches.

Auto-Car. Gasoline Omnibus, 20 M.P.

Auto-Car Co., Buffalo, N.Y.

PRICE—$3,000.
BODY—Omnibus, drop sash.
SEATING CAPACITY—Fourteen persons.
FRAME—Angle iron.
BRAKES—Expanding on rear hubs.
TIRES—36 x 3.
CYLINDERS—2, horizontal opposed.
COOLING—Pump, chain driven; coil cooler in front.

IGNITION—Jump spark, double coil.
CLUTCH—Friction.
TRANSMISSION—Planetary.
SPEEDS—2, forward and reverse.
DRIVE—Double chain.
WHEEL BASE—95 inches.
TREAD—56½ inches.
WEIGHT—2,800 pounds.



Compound. Model 9, 12-15 M. P.

E. H. V. Company, Middletown, Ct.

PRICE—$1,400.
BODY—Aluminum.
LOAD CAPACITY—Two tons.
FRAME—Pressed steel.
BRAKES—On driving shaft, internal expanding hub.
TIRES—28 x 3½.
CYLINDERS—3, vertical, under bonnet.
COOLING—Water by positive gear pump.

IGNITION—Jump spark.
CLUTCH—Inverted leather-lined cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Double chain or shaft.
WHEEL BASE—96½ inches.
TREAD—56½ inches.
WEIGHT—1,800 pounds.



Atlas Gasoline Truck. Model A, 24 M. P.

Knox Motor Truck Co., Springfield, Mass.

PRICE—$3,000.
BODY—Express.
CAPACITY—Two tons.
FRAME—Channel steel, 5-inch.
BRAKES—External and internal double on driving wheels.
TIRES—4 and 5 inches, solid rubber.
CYLINDERS—2, horizontal.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Spur gear.
WHEEL BASE—96 inches.
TREAD—58 inches.
WEIGHT—5,000 pounds.



Atlas Gasoline Truck. Model B, 24 M. P.

Knox Motor Truck Co., Springfield, Mass.

PRICE—$3,200.
BODY—Express or stake.
LOAD CAPACITY—6,000 pounds.
FRAME—Channel steel, 5-inch.
BRAKES—2 sets double-acting on rear wheels.
TIRES—5 and 6 inch solid rubber.
CYLINDERS—2, horizontal.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Cone.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Spur gear.
WHEEL BASE—114 inches.
TREAD—58 inches.
WEIGHT—6,000 pounds.

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Pope-Toledo. Three-seated Wagonette, 45 M. P.

BODY—Special.
SEATING CAPACITY—Nine persons.
FRAME—Armored wood.
BRAKES—On drive shaft and internal expanding brakes on rear wheels.
TIRES—36 x 5 inches.
CYLINDERS—4, vertical, 5 x 5¾.
COOLING—Water and pump.

IGNITION—Jump spark.
CLUTCH—Rotary and gear driven
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Outside chain.
WHEEL BASE—114½ inches.
TREAD—54½ inches.
WEIGHT—2,650 pounds, without top.

Pope Motor Car Co., Toledo, O.



Four Wheel Drive Truck.

BODY—Stake.
LOAD CAPACITY—Three to five tons.
FRAME—1 piece cold rolled ship channel.
BRAKES—Internal, expanding on rear wheel hub drums.
TIRES—Second growth rock elm blocks.
CYLINDERS—4, 4-cycle, separate, 4¼ x 5.
COOLING—Water, gear pump, radiator and 2 fans.

IGNITION—Jump spark, Remy magneto.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3, forward and reverse.
DRIVE—Bevel gear on front and rear axles.
WHEEL BASE—168 inches.
TREAD—56⅝ inches.
WEIGHT—7,500 pounds.

Four Wheel Drive Wagon Co., Milwaukee, Wis

Commercial Truck. Model Stake. 30 M. P.

PRICE—$3,000.
BODY—Platform 6 x 12 loading space, raised driver's seat.
FRAME—Channel iron.
BRAKES—Internal, expanding on rear wheel.
TIRES—4 x 5, non-skid, solid.
CYLINDERS—4, horizontal-opposed.
COOLING—Water.

IGNITION—Battery, coil and jump spark.
TRANSMISSION—Internally engaged gears always in mesh.
SPEEDS—3 forward and reverse.
DRIVE—Chains from countershaft.
WHEEL BASE—108 inches.
WEIGHT—4,000 pounds.

Commercial Motor Car Co. New York, N. Y.



Vehicle Equipment Co. Model 1000 lb. Delivery Wagon

BODY—Wood, closed panel.
CAPACITY—1,000 pounds.
FRAME—Channel steel.
BRAKES—1 expanding foot brake.
TIRES—36 x 3 x 3½, Firestone.

SPEEDS—4 ahead, 2 reverse.
DRIVE—Chain.
WHEEL BASE—89 inches.
TREAD—56⅝ inches.

Vehicle Equipment Co. Long Island City, N. Y.



Vehicle Equipment Co. Model Five-ton Hoist Truck

BODY—Stakes, wood.
CAPACITY—Five tons.
FRAME—Channel steel.
BRAKES—1 expanding foot.
TIRES—36 x 7, Firestone.

SPEEDS—5 forward, 2 reverse.
DRIVE—Chain.
WHEEL BASE—134¼ inches.
TREAD—69½ inches.

Vehicle Equipment Co. Long Island City, N. Y.



Vehicle Equipment Co. Model Three-ton Truck

BODY—Rack sides, wood.
CAPACITY—Three tons.
FRAME—Channel steel.
BRAKES—1 expanding foot, 1 electric.
TIRES—36 x 6 x 7; Firestone.

SPEEDS—4 ahead, 2 reverse.
DRIVE—Gear.
WHEEL BASE—102 inches.
TREAD—64 inches.

Vehicle Equipment Co. Long Island City, N. Y.



Vehicle Equipment Co.

BODY—Panel, wood.
CAPACITY—3,000 pounds.
FRAME—Structural steel.
BRAKES—1 foot, 1 electric
TIRES—36 x 3½ x 5; Firestone.

SPEEDS—4 ahead, 2 reverse.
DRIVE—Gear.
WHEEL BASE—102 inches.
TREAD—56⅝ inches.

Vehicle Equipment Co. Long Island City, N. Y.

Vehicle Equipment Co. Model 2000 lb. Delivery Wagon

BODY—Closed panel, wood.
CAPACITY—2,000 pounds.
FRAME—Channel steel.
BRAKES—1 expanding.
TIRES—36 x 3½ x 4, Firestone.

SPEEDS—4 ahead, 2 reverse.
DRIVE—Chain.
WHEEL BASE—101 inches.
TREAD—56⅝ inches.

Vehicle Equipment Co. Long Island City, N. Y.

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V. E. Co. Model 2 Ton Truck. — Vehicle Equipment Co., Long Island City, N. Y.

BODY—Wood, rack sides.
CAPACITY—Two tons.
FRAME—Channel steel.
BRAKES—1 foot, 1 electric.
TIRES—36 x 5, Firestone.

SPEEDS—4 ahead, 2 reverse.
DRIVE—Gear.
WHEEL BASE—96 inches.
TREAD—57½ inches.

Wolverine. Model N, 10 M. P. — Wolverine Automobile & Commercial Vehicle Co., Dundee, Mich.

PRICE—$750.
BODY—Delivery type, with cubic yard luggage space.
SEATING CAPACITY—Two persons.
FRAME—Angle steel.
BRAKES—Internal hub, equalizing device, lever operated.
TIRES—28 x 3.
CYLINDERS—2, 2-cycle.
COOLING—Water tank, 4 gallons, in the dash.

IGNITION—Jump spark, single coil, in the dash.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Bevel gear shaft.
WHEEL BASE—80 inches.
TREAD—56 inches.
WEIGHT 1,100 pounds.

Rapid. 18 M. P. — Rapid Motor Vehicle Co., Pontiac, Mich.

PRICE—$1,800.
BODY—Express.
CAPACITY—3,000 pounds.
FRAME—108 inch chasis, 2 x 3½ angle iron.
BRAKES—Internal hub rear wheels and emergency.
TIRES—35 inches.
CYLINDERS—2 double opposed.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Friction
TRANSMISSION—Planetary.
SPEEDS—High, low and reverse.
DRIVE—Double chain on sides.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—2,400 pounds.

Maxwell. Model O, Delivery Wagon, 16 M. P. — Maxwell-Briscoe Motor Co., Tarrytown, N. Y.

BODY—Wood.
CAPACITY—Two persons and 1,000 pounds.
FRAME—Pressed steel.
BRAKES—Hub and drum on transmission.
TIRES—30 x 3½.
CYLINDERS—2, double opposed.
COOLING—Thermo siphon.

IGNITION—Jump spark.
CLUTCH—Multiple disc.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—85 inches.
TREAD—56 inches.
WEIGHT—1,575 pounds.



Reo Model. Wagonette Bus, 16 M. P. — Reo Motor Car Co., Lansing, Mich.

PRICE—$1,600.
BODY—Wood.
SEATING CAPACITY—Ten persons.
FRAME—Pressed steel.
BRAKES—On sprocket, hand on rear wheels.
TIRES—30 x 4.
CYLINDERS—2, horizontally-opposed.
COOLING—Water, positive gear pump.

IGNITION—Jump spark, dry batteries.
CLUTCH—Multiple disc.
TRANSMISSION—Planetary (no internal gears).
SPEEDS—2 forward and reverse.
DRIVE—Direct, single chain.
WHEEL BASE—90 inches.
TREAD—55 inches.
WEIGHT—1,800 pounds.



Duryea. Light Stage, 12-15 M. P. — Duryea Power Co., Reading, Pa.

PRICE—$1,200.
BODY—Wood, curved line.
SEATING CAPACITY—Eight persons.
FRAME—Armored bent wood.
transmission.
BRAKES—Internal expanding on rear axle.
CYLINDERS—3, across body under seat, inclined
COOLING—Water, pump and thermo-siphon.

IGNITION—Make and break magneto, low tension.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—78 inches.
TREAD—56 inches.
WEIGHT—1,200 pounds.



Duryea. Delivery Wagon, 12-15 M. P. — Duryea Power Co., Reading, Pa.

PRICE—$1,250
BODY—Wood, curved line
SEATING CAPACITY—Two persons.
FRAME—Armored bent wood.
BRAKES—Internal expanding on rear axle, low clutch.
TIRES—Front, 30 x 3; rear, 36 x 3½.
CYLINDERS—3, across body under seat, inclined.
COOLING—Water, with pump and thermo siphon.

IGNITION—Make and break magneto, low tension.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Single chain.
WHEEL BASE—96 inches
TREAD—56 inches
WEIGHT—1,300 pounds.



Cadillac, Model M, Delivery 10 M. P. — Cadillac Motor Car Co., Detroit, Mich.

PRICE—$950.
BODY—Wood.
LOAD CAPACITY—800 pounds.
FRAME—Pressed steel.
BRAKES—Double acting on differential.
TIRES—30 x 3½.
CYLINDERS—1, under body.
COOLING—Water.

IGNITION—Jump spark.
TRANSMISSION—Planetary.
SPEEDS—2 forward and reverse.
DRIVE—Cotter pin chain.
WHEEL BASE—76 inches.
TREAD—56 inches.
WEIGHT—1,400 pounds.

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Pope-Waverley. Three-Ton Truck

Pope Motor Car Company
Indianapolis, Ind.

BODY—16 feet 5 inches over all with 7 feet 6 inches carrying space, 13 feet long, 4½ feet wide, height 6 feet.
BRAKES—Hub and countershaft.
TIRES—36 x 5, solid rubber.
MOTORS—2 hung from chains in front of rear axle.

BATTERY—42 cells m.v. Exide or 42 cells w.b. National.
TRANSMISSION—Double reduction gears.
DRIVE—Double side chain drive.
WHEEL BASE—112 inches.
TREAD—76 inches.



Pope-Waverley. Model 43, Closed Delivery Wagon

Pope Motor Car Co.
Indianapolis, Ind.

PRICE—$1,850.
BODY—Length over all 10 feet 8 inches, width 5 feet 10 inches.
CARRYING SPACE—Length, 5 feet 3 inches; width, 3 feet 4 inches; height, 4 feet 8 inches
BRAKES—Hub and countershaft.
TIRES—32 x 36 x 3, solid rubber.
MOTOR—Single.

BATTERY—42 cells of 11 p.v. Exide, or 42 cells of 11 c.h. National.
TRANSMISSION—Double reduction.
DRIVE—Double side chain drive.
WHEEL BASE—103 inches.
TREAD—5 feet.



Pope-Waverley. Model 64, Open Delivery Wagon

Pope Motor Car Co.
Indianapolis, Ind.

PRICE—$1,500.
BODY—Length over all, 9 feet 3 inches; width over all, 5 feet 6 inches.
CARRYING SPACE—Length, 5 feet 2 inches.
BRAKES—Foot and electric.
TIRES—30 x 3, solid rubber tires.
MOTOR—1, suspended from body in front of rear axle.

BATTERY—40 cells of 9 p.v. Exide, or 40 cells of 9 c.h. National.
TRANSMISSION—Double reduction gears.
DRIVE—Double side chain drive.
WHEEL BASE—80 inches.
TREAD—54 inches.



Pope-Waverley. Five-Ton Truck

Pope Motor Car Co.
Indianapolis, Ind.

BODY—Length over all, 17 feet 4 inches; width over all, 7 feet 9 inches.
CARRYING SPACE—Length 13 feet 5 inches; width, 4 feet 5 inches.
BRAKES—Hub and countershaft.
TIRES—36 x 42 x 6, solid rubber.
MOTORS—2, hung from chassis in front of rear axle.

BATTERY—42 cells 19 m.v. Exide, or 42 cells 19 w.h. National.
TRANSMISSION—Double reduction gears.
DRIVE—Double side chain drive.
WHEEL BASE—195 inches.
TREAD—80 inches.



Pope-Waverley. One-Ton Truck

Pope Motor Car Co.
Indianapolis, Ind.

BODY—Length over all, 15 feet; width over all, 7 feet 2 inches.
CARRYING SPACE—Length, 11 feet 4 inches; width, 4 feet 3 inches.
BRAKES—Hub and countershaft.
TIRES—36 x 42 x 3, solid rubber.
MOTORS—2, hung from chassis in front of rear axle.

BATTERY—42 cells 11 m.v. Exide, or 42 cells 11 w.h. National.
TRANSMISSION—Double reduction gears.
DRIVE—Double side chain drive.
WHEEL BASE—92 inches.
TREAD—82 inches.



Logan. Model I, 10 M. P.

Logan Construction Co., Chillicothe O.

PRICE—$1,000.
BODY—Box bed or closed frame, 4 x 6 x 3 x 3.
CAPACITY—1,500 pounds.
FRAME—Angle steel.
BRAKES—Band contracting.
TIRES—28 x 2½ solid.
CYLINDERS—Opposed, cross in front.
COOLING—Air with fan.

IGNITION—Jump spark, dry cells.
CLUTCH—Band contracting.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Chain.
WHEEL BASE—86 inches.
WEIGHT—1,150 pounds.



Logan. Model J, 30 M. P.

The Logan Construction Co., Chillicothe, O.

PRICE—$2,000 for chassis.
BODY—Optional, extra.
CAPACITY—4,000 pounds.
FRAME—Angle steel.
BRAKES—3 band contracting.
TIRES—32 x 4, solid.
CYLINDERS—Opposed.
COOLING—Water.

IGNITION—Jump spark.
CLUTCH—Band contracting.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Double chain.
WHEEL BASE—100 inches.
TREAD—56 inches.
WEIGHT—2,500 pounds.

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Diamond



17,402 Miles

JUST ONE OF THE SEASON'S RECORDS FOR

Diamond

WRAPPED TREAD TIRES

Mr. G. M. Huston and family, of Chicago, spent the summer in touring.

Under date of October 23, 1905, Mr. Huston wrote us from Jacksonville, Florida:

We arrived here from Charleston this A. M., after having traveled over some of the worst roads in the United States between Washington, D. C., and Charleston, S.C. I wish to say to you that your tires are the only make that have ever given me anyways near such service, not having had a blowout and but five punctures in 17,402 miles, and still having one casing on front wheel that was on the car when I purchased my machine from the White people in Cleveland last April, and so far as I can see it is still good.

Over 3,000 miles of out travel has been over mountain roads, and in appreciation of a good thing I am recommending The Diamond Tires to all my friends. Without fear of contradiction I believe your automobile tires to be the best in the world, batring none.

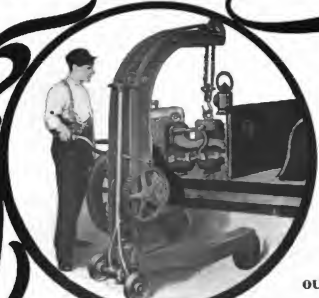
Trusting that you may have continued success, I am,

Very respectfully yours,
G. M. HUSTON, Chicago, Ill., 7659 Normal Ave

The retreading of three casings and making vulcanized repairs on three inner tubes, which had been punctured, constitute the only tire repairs Mr. Huston has had to have in the 17,402 miles traveled.

THE DIAMOND RUBBER CO., Akron, Ohio

THE FRANKLIN PORTABLE CRANE & HOIST



A Necessary Garage Convenience

It is a simple matter to lift a motor from a machine with this hoist

And Just as Easy

To hoist one end of an automobile several feet from the floor, thus making the parts under the car accessible and avoiding the use of a dark and dirty *pit*.

A Great Advantage

Is the compactness of this hoist. While it takes practically no room, any weight up to 3,000 lbs. can be lifted with ease.

As the Illustration Shows

It can be rolled to any part of a garage or factory and one man can operate it and do the work of five men. We solicit a thorough investigation of the merits of the crane.

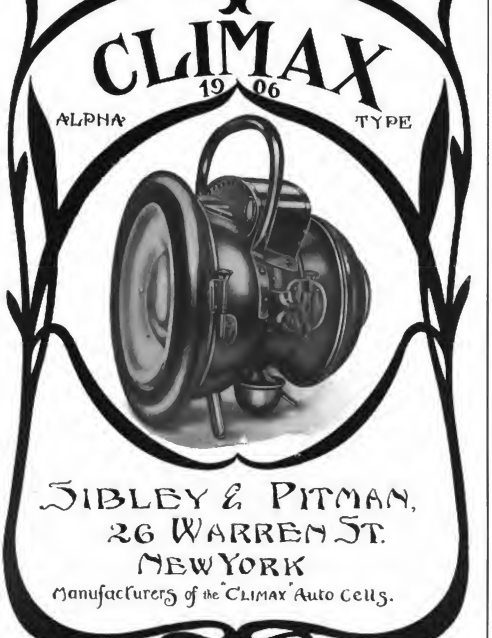
OUR NEW DISCOUNTS MAY INTEREST YOU

Write for Illustrated booklet for all the facts about this crane

FRANKLIN PORTABLE CRANE & HOIST CO.

FRANKLIN, - - - - - - PENNSYLVANIA

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LEA TIRE PUMP



Easy to use and the pressure gauge insures even inflation of all tires—makes them last longer.

Write for illustrated booklet D, and proposition to agents.

William S. Jones, 112 North Broad St., Philadelphia

Sole Selling Agent for Motor Car Specialty Co., Trenton, N. J.

Do you understand your Motor?

THE GAS ENGINE is a monthly magazine devoted to gasoline engines — automobile, marine, stationary. $1 per year. Specimen free

THE AUTOMOBILE POCKETBOOK, by E.W. Roberts, 325 pp., leather, price, $1.50.

THE GAS ENGINE PUB. CO.
58 Blymyer Bldg., Cincinnati, Ohio

MIDGLEY
Artillery Pressed Steel Wheels
Carried in stock to fit Stanley Runabout and Touring Car, Oldsmobile and Autocar. We have a special offer to Stanley Operators.
Write for booklet.
MIDGLEY MFG. CO. - Columbus, Ohio

PATENT SINGLE PIECE VALVES
All types and sizes in stock



Eastern Representative:
Sidney A. Bass, 1691 Broadway, New York
Pacific Coast:
Heinemann-Pearson Co., 1028 S. Main Street Los Angeles, California
B. MORGAN, 36-38 JOHN ST., NEWPORT, R. I.

Automobile "CROVENETTE" WIND and RAIN COATS
Cost you but $10.00 at
WHY PAY $15.00 to $25.00? TOM MURRAYS
Jackson Bv. near S. of T.
CHICAGO

DELIVERED F. O. B.

ONE of the vexatious features in everyday commercial life is the wrangle shipper and consignee have about overcharge in freight expenses or damage and loss to goods. A shipper will sell a bill of goods to a country customer, and the customer, when settling, will deduct from the invoice the amount he believes was collected from him in excess of proper freight charges by the railroad. He does not know the exact freight rate, which should have been assessed on his shipment, but he knows that some time ago he received a similar shipment, for which the railroad collected $2.85, while this time he was made to pay $4.10, and he forthwith deducts $1.25 when paying the shipper's invoice, leaving to the latter to collect the overcharge from the railroad as best he can.

It is not our intention to go into any discussion here as to whether a claim for overcharge or damage really existed. We assume it did exist. What, then, should have been the proper course for the consignee to pursue; in other words, was he justified in deducting his claim against a railroad from shipper's invoice, or should the consignee have assumed himself the burden of collecting the claim from the railroad company?

For the benefit of thousands engaged in business seemingly unable to determine this question correctly, a brief definition of the common law governing this subject is submitted herewith.

If A, at Philadelphia, sells to B, at Cincinnati, a bill of goods on terms "delivered F. O. B. (free on board), Philadelphia," the place at which the contract is to be filled is Philadelphia. This means that A tenders his goods to B at Philadelphia for acceptance, and if B, of Cincinnati, for convenience sake, declines to come to Philadelphia and receive his goods, and instead instructs A to send him the shipment by railroad or otherwise, it is B, of Cincinnati, who thereby assumes all risk involved in shipping.

If S, at Kansas City, sells W, at Buffalo, five carloads of corn, delivered "F. O. B., Buffalo," the place for filling the contract is Buffalo. It means that S, of Kansas City, has to bring the five cars of corn, that is the quantity contained therein, to Buffalo at his own risk and expense, and there tender the goods to the buyer for acceptance. Should any of the cars have a leaky roof, causing damage to the corn by wet, or some of the corn was lost in transit through a hole in the floor of a car, or an overcharge in freight expenses exists, it is S. of Kansas City, who must assume the risk. If, however, Mr. S., of Kansas City, is willing to pay the freight charges, but is unwilling to assume the risk involved in shipping, he can offer and sell his corn to W at Buffalo, "delivered F. O. B. Kansas City, Mo., freight allowed to Buffalo." In this case the place of filling the contract is Kansas City, and W, of Buffalo, will have to come to Kansas City, examine and accept there the corn, or assume himself all risk involved in shipping, should he elect to stay at home and order the corn forwarded to him to Buffalo.

(Copyright, 1905, by Eugene V. Sharp)

A FEW AUTO-KNOW-BETTERS

By Helena Smith Dayton

To Unrecognized Old Party. These automobiles To Sporty Speeder.....My old boat
Boastful Person.....My friend's auto
Envious Pedestrian.....Confounded, etc.
Little Johnny.....Busy wagon
The Hobo.....Gas buggy
The Professional.....My car
Up-to-date-Owner.....My motor
Country Sheriff.....Pot Boilers
Repair Man.....Cinch
Man Who Build 'Em.....Whizzer XIIIXIV
Salesman.....Our Improved 1908 Model
Girl Enthusiast.....That Sweet Blue Devil

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Aerocar

The Car of Today, Tomorrow and for Years to Come

—(BUILT BY PRACTICAL MEN)—

The *Aerocar* comes as the fulfillment of all that has been proven best in the air-cooled motor car. It represents the efforts of ten years of constant experimenting, testing and proving—a motor car of enduring serviceability—superior in mechanical design and construction and carrying all the luxury and beauty in modern motor car equipment.

It is the one air-cooled motor car which overcomes all obstacles and objections in practical test.

The motor is the very soul of an automobile, and while the *Aerocar* is ideal in the graceful lines of body, in its roomy luxuriousness and elegance of equipment, it is in the air-cooled motor that its distinguishing superiority lies. Its motor is of wonderful efficiency—it is the crowning result of ten years constant effort along most practical investigation, studying and experimenting with all the adapted methods and designs of air-cooled motors, selecting the best of each, improving and adding to, until we have for the *Aerocar* an air-cooled motor which may rightly be called perfect in operation and for satisfactory results—always ready, night or day, in the hottest of mid-summer or the coldest zero of mid-winter, to meet every reasonable demand.



Aerocar 1906. 25-26 h. p. Four cylinders, Five passengers, 45 miles an hour. 104 inch wheel base. Shaft drive. Sliding gear transmission. Three speeds and reverse. Perfect disc clutch. Hollow steel dash. Four sight lubricator on dash. Tool box on running board. 32 x 4 tires. 9 inch road clearance. Weight 2000 pounds. Fully equipped, ready for the road, including two large gas headlights. *$2500 f. o. b. Detroit.*

Ready and anxious to demonstrate any time or all times

READY TO DELIVER CARS IN FEBRUARY

Will be exhibited and demonstrated at the Automobile Shows in New York and Chicago.

The dealer who has the selling agency of the *Aerocar* will have a gold mine. If interested write us promptly. Territory being rapidly taken up.

The AEROCAR COMPANY, DETROIT, MICH.

To try an Acme is to buy an Acme

Acme Motor Cars

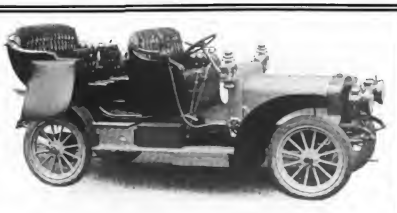
prove on actual practical road demonstration every essential feature of advanced and perfected automobile engineering to-day.

The Acme claims of superiority are based on these cardinal points:

Highest Efficiency
Ease of Control
Smooth, Quiet Running
Highest Power in Proportion to Weight
Strength and Compactness
Beauty of Design

GUARANTEED FOR 365 DAYS

Acme Motor Cars are built entirely and wholly by the Acme Motor Car Company, which means there are no bought parts for assembling—NO UNKNOWN QUANTITIES.



1906 ACME CARS

SPECIFICATIONS—TYPE XV

Price . . . . . $3500. Complete with two Side Oil Lights, two Acetylene Head Lights and Generator, Tail Light and Horn.
Type . . . . . Touring Car.
Seating Capacity 7 persons.
Weight . . . . 4000 lbs.
Wheel Base . . 134 inches.
Tread . . . . . 56 inches.
Clearance . . . 10 inches.
Body . . . . . Double Side Entrance Tonneau, divided front Seats, made of best seasoned Ash, Poplar and Basswood.
Seats . . . . . Soft Edged, Spring, Cushioned Seats and Backs; width, front, 19 in., depth, 18 in.; width, rear, 32 in., depth, 18 in.

Leather . . . . Best Quality, Hand Buffed, Pebble Grained, French Finished.
Frame . . . . . Cold Rolled Nickel Steel, 180,000 lbs. tensile strength.
Axles . . . . . Front Nickel Steel, drop forged "I" Beam, Spring. Seats integral with Axle; rear 1 1-2 in. square, Nickel Steel forged.
Clutch . . . . . Multiple Disc, running in oil, self-contained, no end thrust on bearings.
Transmission . Practically indestructible. Selective Sliding Gear, direct drive on 3rd speed.

Speeds . . . . . 4 speeds forward and one reverse on one lever.
Gears . . . . . Chrome Nickel Steel, oil tempered 112,000 lbs. tensile strength.
Bearings . . . . Annular Ball, full type, non adjusting, Lemoine pattern
Sprag . . . . . Internal Rachet in Sprocket of each Wheel.
Bolts and Nuts . All Bolts and Nuts throughout car, case hardened, and locked with Spring Lock Washers and Cotter Pins.
Gearing . . . . Speed of Engine, 1000 R. P. M., 20 1-2 T. Sprockets.

Speed	Gear Ratio	Miles Per Hour
3rd DIRECT DRIVE	3.88	33.1
2nd	5.22	19.4
1st	9.98	10.1
Reverse	12.61	8.0

TYPE XIV $2,750

Of the same practical construction as type XV. Greatly improved in arrangement and larger body than last year.

DEMONSTRATION OF TYPE XV OR TYPE XIV BY APPOINTMENT

ACME MOTOR CAR CO. : : **Reading, Pa.**

PHILADELPHIA BRANCH 1335 ARCH STREET

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The Stearns

A fulfillment of Prophecy

One Model 45 Horse Power

Produced by a determination to fulfill now the prophecy of ultimate supremacy for American Automobiles—the result of devoting one factory for ten years to perfecting one model.

We buy material in any country that produces the best for the purpose; but American machinists finish it all—they spend over two thousand hours on each car finishing parts otherwise complete. More time and care than any other touring car receives.

Fitted parts are required when picked up at random to snap together like your watch lid, hang tight, yet part in the hands.

By what process could any maker, anywhere, produce a better car. Where is another so made?

After producing this car we figured the cost and selling price. We were pleased to find that the duties and excessive commissions on our only competitors make our charge—$4,750—barely half the cost of any foreign car that makes a comparison possible.

We seek communication with those who will appreciate this car. For such it will give a service greater than any other mechanism the world has produced. Shall we send our book of details?

THE F. B. STEARNS CO., Members A. L. A. M.
New York Branch, 121 W. 89th St.
2970 Euclid Avenue, Cleveland, O.



Special Body, Price on Application

Agents, equipped to handle such a car, desired.

TAKE YOUR CHOICE

But the easy way to clean your auto, carriage, wagon, or sleigh is with the

ARDREY VEHICLE WASHER

(Pat. Aug. 29, 1905.)

No cold hands. No soiled clothing. Cleans in ½ the time. Saves ½ the work. Made of solid brass. Fits any ordinary hose. Sponge always clean. Impossible to scratch or injure finest finish. Prepaid $3.00. Send to-day. Booklet FREE.

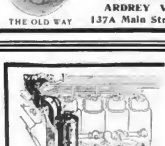
ARDREY VEHICLE WASHER COMPANY
137A Main Street Rochester, N. Y.



THE OLD WAY



THE ARDREY WAY



ESSEX IMPROVED

AUTOMATIC

Lubrication is the only successful method of lubricating AUTOMOBILES. ALWAYS READY and never get out of ORDER. 20,000 in use.

G. B. ESSEX BRASS CO.
DETROIT, MICH.

THE ORMOND-DAYTONA RACE MEET

(Continued from page 51)

Heavyweight Championships.—Nos. 7, One Mile Heavyweight Championship (gasoline); No. 8, Five Mile Heavyweight Championship (gasoline); No. 9, Ten Miles Heavyweight Championship (all powers).

Middleweight Championships.—No. 10, One Mile Middleweight Championship (gasoline);



A BIT OF CUBAN ROAD OVER WHICH THE CUBAN RACE WILL BE RUN

No. 11, Five Miles Middleweight Championship (gasoline); No. 12, Ten Miles Middleweight Championship (all powers).

Steam Championships.—No. 13, One Mile Championship; No. 14, Five Miles Championship.

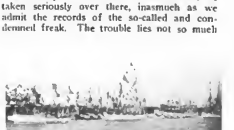
Amateur Championships.—No. 15, Ten Miles Corinthian Championship (see information for entrants); No. 16, Ten Miles Corinthian Handicap.

Miscellaneous.—No. 17, Ten Miles Open Handicap, to contestants who start in previous events; No. 18, Fifteen Miles Price Handicap, for American touring cars fully equipped; No. 19, Thirty Miles Free-for-All Championship for American-built cars.

One-Mile Record Trials.—No. 20, Lightweight (gasoline); No. 21, Middleweight (gasoline); No. 22, Heavyweight (gasoline); No. 23, Steam.

One Kilometre Record Trials.—No. 24, Lightweight (gasoline); No. 25, Middleweight (gasoline); No. 26, Heavyweight (gasoline); No. 27, Steam.

It is to be hoped that this year will see no freaks at Ormond-Daytona, but that the standard features of motor-car construction will prevail in those cars which make records accepted as official. The complaint that comes to us from Europe is that our records cannot be taken seriously over there, inasmuch as we admit the records of the so-called and condemned freak. The trouble lies not so much



A GLIMPSE OF THE FIRST MOTOR-BOAT CARNIVAL AT PALM BEACH

with us as with our cousins across the sea. The rules which govern racing here and abroad originated with the Automobile Club of France, were copied by the Automobile Club of Great Britain and Ireland, and confirmed by the Automobile Club of America, and, finally, by the American Automobile Association, under whose sanction the Ormond-Daytona tournament, as well as all official race meets in this country, are held. If the contention from abroad is true, these rules are at fault, for, in following the letter of their dictation, we

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STEVENS-DURYEA

Twenty-Horse Power
Four Cylinder

TOURING CAR

Weight, 1,700 Lbs.
Price, $2,500

The Stevens-Duryea will stand more punishment on muddy, rutty, hilly, sandy, stony, bumpy, "thank-you-ma'am" roads without breaking, chafing, blowing up or wearing out tires, cutting out engine bearings, springing the frame or breaking the springs than any four-cylinder car in existence. Such immunity is worth several hundred dollars to you during the life of the car. It is due entirely to our "Unit Power Plant" and its "three point support."



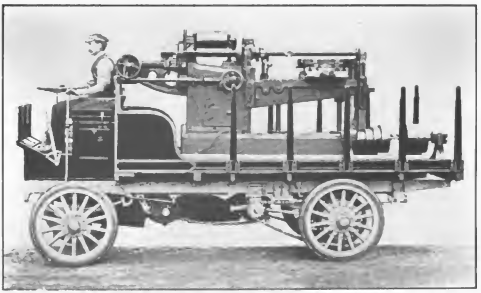
If you can't see why and want to,—get our booklet.

J. STEVENS ARMS & TOOL CO.
712 MAIN STREET
CHICOPEE FALLS, MASS., U.S.A.
Member A. L. A. M.

Knox Waterless Gasoline
THREE TON TRUCK

Carrying Capacity 6,000 lbs.

Speed 10 miles per hour.



Air cooled chassis adapted to various styles of bodies.

This truck is saving time and money for business men all over the country. We are pleased at any time to demonstrate that it will do the same for you. Write for catalogue.

Our display of pleasure and commercial cars at the New York Show, Madison Square Garden, only, January 13-20, will be the largest and finest ever shown. Do not fail to inspect.

Agents in all principal cities.

Knox Automobile Company, Springfield, Mass.

Largest and oldest manufacturers of commercial cars. Member of Association of Licensed Automobile Manufacturers.

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THE "AMERICAN"
STORAGE BATTERY FOR IGNITION
— MONITOR TYPE —

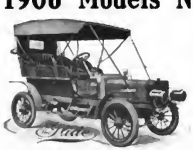


VOLTAGE—4, 6 AND 8. CAPACITY—20 AMPERES. BOUND. PRICES—$6.00, $8.00, $10.00.
OTHER STYLES—$6.00 to $65.00.
CATALOGUE ON REQUEST.
PATENTS ALLOWED 1900.
AMERICAN BATTERY COMPANY
100 SOUTH CLINTON ST., CHICAGO, ILL.



NIEUPORT
the plug that SPARKS LONGEST, and requires LEAST ATTENTION
PRICE, $1.50
Ask your dealer or write us.
Albert Champion Company
541 Tremont Street,
Boston, Mass.
Importers of Spark Plugs, Coils, Ignition Wires, Batteries, Etc.

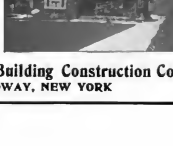
1906 Models Now Ready



GLIDE Model E is a 30 h. p. car with a vertical four-cylinder motor. Bevel gear drive. Graceful design and beautiful finish. Our new Model F is an 18 h. p. car with a two-cylinder horizontal opposed motor. Both of these cars are winners in their respective classes. Advance catalogues are now ready.
MODEL E, 30 H. P. GLIDE
THE BARTHOLOMEW CO.
413 BRADLEY AVE. PEORIA, ILL.
Member American Motor Car Manufacturers' Association.



GARAGES
Portable, and of Architectural Design
PRICE, $100.00 AND UP.



Portable Dwellings, Stables, Boat Houses, Camps and Out-Buildings of all Descriptions
PRICES ON APPLICATION
C. & A. Patented Building Construction Co.
170 BROADWAY, NEW YORK

have admitted cars as official competitors in race meets which are not specifically excluded by the rules, but which Europe, without amending the rules, have barred.

There is no question but that the time has arrived when this country, in motor-car racing, as it already has done in nearly everything else, must assert its independence of European dictation. If the racing rules are at fault for many of the blunders of judgment which mar the efforts of some enthusiastic motor-car entrant, it is about time that something were done in the way of framing the rules governing racing in such a manner that under no possible circumstances could such a freak as the *Tea-Kettle* gain official cognizance as anything other than a freak.

Palm Beach.—The Palm Beach motor-boat races, from January 30 to February 2, this year, promise to be greater than ever. Henry M. Flagler is president of the Palm Beach Power Boat Association, under whose auspices the meet is conducted. The executive committee is composed of W. Gould Brokaw, Lieutenant Hugh L. Willoughby, Leland Sterry, John S. Clarke, and A. D. Proctor Smith. The last carnival was the best ever seen in the South, and it is doubtful if any tournament in the North the past summer furnished more interesting races than did the carnival on Lake Worth last winter.

Lake Worth furnishes a sheet of water which for speed purposes cannot be excelled, and those who saw the last tournament there declare that a winter American Henley will be the outcome of these pioneer tournaments.



EMULATION: THE YOUNGSTERS OF FLORIDA HAVE IMPROVISED "RACERS" TO WHICH THEY HAVE GIVEN THE NAMES OF THE CARS WHICH WERE SO SUCCESSFUL LAST JANUARY

Among the positive entries will be some of the fast boats that were seen in races in New York waters the past summer, together with some new boats whose speed is yet unknown. Florida motor-boat builders will have at least a dozen speedy boats as contenders in the tournament and some of the boats built on the Florida east coast may surprise some of the Northern builders and owners.

The Cuban Road Race.—After Palm Beach will come the Cuban road race of 200 miles, on February 11, 1906, which last year (only 100 miles) was won by Ernesto Carriburu, a Cuban chauffeur, in a 60-motor-power Mercedes, owned by C. J. Conill, president of the International Automobile Racing Association of Cuba, which promoted the meet. The fact that a Cuban driver won the race on Cuban soil aroused unbounded enthusiasm throughout the island and led to motoring and the purchase of motor-cars there an impetus which could not have been secured in any other way. The course over which the race was run was just one-third of a mile short of fifty miles, making it two-thirds of a mile short of the one hundred miles, the approximate distance of the race.

The course was patroled by cyclists of the several Havana clubs, and 180 men of the rural guards were placed at the culverts along the line. Carriburu's time for the 99.33 miles, to be exact, was 1 hour, 50 minutes, and 53 3-5 seconds, an average of 53.7 miles per hour. Joe Tracy, driving Major C. J. S. Miller's 30-motor-power Renault, finished second, in 1 hour, 52 minutes, and 26 seconds. Louis Marx, driving his own 30-motor-power Mercedes touring car, scored in third place, and Joseph Birk, in M. P. G. Mendoza's 300-motor-power De Dietrich, was fourth, and Harry Fletcher, in O. F. Thomas's 80-motor-power De Dietrich, which won the Vanderbilt plate at Ormond-Daytona, was a tail-ender, owing to a punctured tire and a broken oil-tank connection.

Low Tide on Ormond-Daytona Beach, Jan. 8 to Feb. 12, 1906

1906.	Low Water.	1906.	Low Water.
Jan. 8	12:10 p.m.	Jan. 27	3:05 p.m.
Jan. 9	12:50 p.m.	Jan. 28	3:45 p.m.
Jan. 10	1:30 p.m.	Jan. 29	4:30 p.m.
Jan. 11	2:15 p.m.	Jan. 30	5:15 p.m.
Jan. 12	2:55 p.m.	Jan. 31	5:55 p.m.
Jan. 13	3:40 p.m.	Feb. 1	6:40 p.m.
Jan. 14	4:25 p.m.	Feb. 2	7:20 a.m.
Jan. 15	5:10 p.m.	Feb. 3	8:15 a.m.
Jan. 16	6:00 p.m.	Feb. 4	9:10 a.m.
Jan. 17	6:35 a.m.	Feb. 5	10:05 a.m.
Jan. 18	7:40 a.m.	Feb. 6	10:50 a.m.
Jan. 19	8:30 a.m.	Feb. 7	11:40 a.m.
Jan. 20	9:25 a.m.	Feb. 8	12:25 p.m.
Jan. 21	11:00 a.m.	Feb. 8	1:05 p.m.
Jan. 22	11:55 a.m.	Feb. 9	1:50 p.m.
Jan. 23	12:45 p.m.	Feb. 10	2:35 p.m.
Jan. 24	1:35 p.m.	Feb. 11	3:20 p.m.
Jan. 25	2:20 p.m.	Feb. 12	4:00 p.m.

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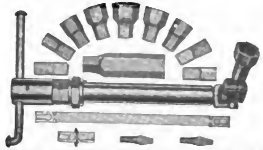
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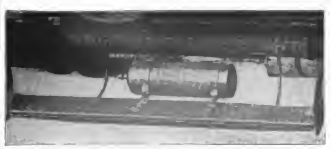
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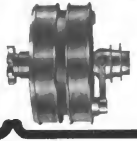
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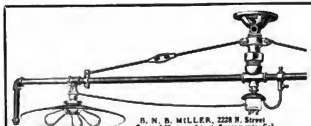
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BOOKS ON MOTORING

The National Battery Company, of Buffalo, N. Y., have just issued a "Book of Instructions on Sparking Batteries," which will be forwarded upon a request from an owner of a motor car.

The distinctive features of the 1906 model "National Sparkers" for ignition purposes are antimoniated lead grids in both the positive and negative plates, combining great strength and rigidity with high capacity secured from a pasted type of plate.

The plates are assembled in rubber jars with rubber covers. The lugs and vent pipe pass through holes in the cover and around them is poured an acid-proof sealing compound, thus effectually preventing slopping of the acid. The positive lug of one cell is joined to the negative lug of the next cell by connecting strips of pure lead burned to the lugs, thus insuring an acid-resisting, perfect connection and an absolutely reliable electrical contact.

The cells are encased in a hard-wood or metal box. The cover cover is of hard rubber and through it pass the stout terminals of pure lead. The brass thumbscrews and nut connectors have a thick covering of lead.

Summarized, they are a non-corrodible battery, of high capacity and great durability, constructed to withstand the hard service occasioned by the vibrations of a high-power car. As the terminals are of extra thickness and constructed of a non-corrodible metal, they will not break or twist off when the connections are tightened.

The National Battery Company also make storage batteries of the pasted type of electric-vehicle service—a type found to be best adapted for this use.

This perfected type of battery is the result of long experimenting and past experience. Above all other considerations are reliability of service in electric vehicles and the advantages of high capacity, minimum weight, efficiency, and long life.

The positive grid is known as the staggered form. It has a large conducting surface, which reduces the internal resistance to a minimum and gives a sustained high voltage during discharge. The active material is specially prepared so as to produce large capacity per pound of plate and allow of high discharge rates without injury.

The negative grid is what is known as the corrugated, punched and clinched type, which is protected by a much litigated and successfully-defended (National) patent. The active material on the two sides of the plate is welded together and firmly held in place by this form of grid construction. This permits of a large conducting area of metallic lead—the great advantages being lightweight and rigidity, combined with maximum capacity per pound of plate.

The rubber jars used with all types of "National Batteries" are furnished with soft rubber lips on the upper edge of the ribs in the bottom of the jar. The jarring that the elements receive while the vehicle is running is thus very greatly reduced; this also largely prevents the dislodging of active material on the plate, which, without the soft-rubber bridge, accumulates in the bottom of the jar, necessitating frequent washings.

If there is any question as to the capacity of cell best adapted to any make of vehicle or any class of service, the National Battery Company will take pleasure in giving all possible assistance upon being informed of the conditions.



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All the speed, all the strength, all the lightness and all the beauty of the imported 1906 Mercedes is repeated in the 1906 American Mercedes.

Every working part in the one has its counterpart in the other. No test of endurance that can be applied to these two cars will bring out a difference between them.

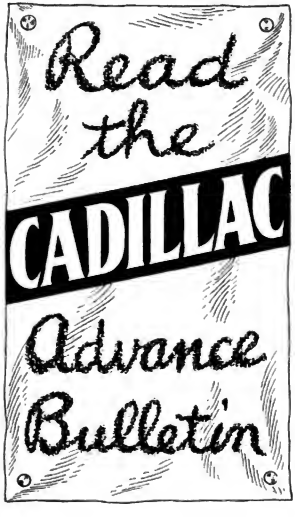
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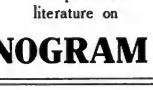
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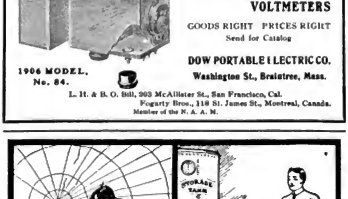


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SPRING RECOIL CHECKS

THE proper control of the springs of motor cars is quite a complex subject, as much so, that there seems to be great diversity of opinion as to the requirements of an appropriate appliance. Some makers contend that the only way to prevent a car from "bumping" or rebounding is to resist the springs on their downward motion to prevent them from bounding upward; for, "If they can't go down, they won't go up." Others contend the springs should be controlled both ways by a friction or something, so that they cannot move freely either way, thus throwing most of the work upon the pneumatic tires and only letting the springs act in an extreme case. While others say, "The only way to make a car ride easily is to give it plenty of spring, they cannot be made too long or elastic. The springs must have plenty of length and room to make the period of vibration as long as possible so one will only get a violent rebound in an extreme case. Keep one's eyes open and drive slowly. Our cars ride all right, because we give them plenty of spring room. We don't like any *friction* or resisting devices. We control the extreme rebound by a big strap from axle to body, which saves the springs, though it gives the body a jerk."

The conditions of motor-car use are so varied and different from that of the horse-drawn vehicle that the experience of the coach builders or spring makers does not seem of much value in eliminating this unpleasant situation.

Where a light road carriage can be drawn by a pair of fleet horses at a speed of twenty miles an hour over an ordinary road, riding easily and comfortably, at a like speed, on same road, with a motor car, the occupants would be off their seats most of the time.

With the light carriage the conditions were met by large wheels, long tread and light body with resilient springs, the whole vehicle not weighing over 150 pounds.

With the motor-car we have small wheels and heavy body, sometimes weighing 2,000 pounds. In this instance the wheels have to be shod with pneumatic, elastic tires, which, in a measure, compensates for the large wheels with long tread that steps across any ordinary depression in the road, thus avoiding, to a certain extent, the jar and jolt of the body. The motor-car, as it were, drops at the depression in the road, thus giving the body, with its heavy load, a start downward, which, with its momentum, compresses the springs and tires. At the same instant the wheels start upwards, the effect of the elastic tires which considerably increases the compression of the springs, sends its load up with highly accelerated velocity.

The laws of inertia are that when a weight is started upward without restraint it continues for a certain period, and, like the swing of a pendulum, returns with about the same force.

The action of the tire is short and powerful, so, when the rebounding tire meets the descending body, it produces the jolt which breaks the springs and makes riding fatiguing.

It has been conclusively demonstrated through an exhaustive series of systematically conducted tests and experiments that any resistance placed between the body and the pneumatic tire is detrimental to its life and endurance. It would seem to be the height of folly to undertake to run a motor-car without any springs and expect to ride comfortably, or to expect a long life and durability of the tires.

The springs cannot be made too long or elastic (if they are properly controlled in their upward movement). With yielding, elastic springs, the wheels with running gear can pass over good-sized obstacles without changing the line of momentum of the body, but, let any resistance be placed to retard the action of the springs, and it will be demonstrated in proportion to the rigidity of the resistance. This has been clearly proven by the track of a tire upon sand-covered mounds, built up on the road where the experiments were conducted, by the normal and abnormal tracks where the tires set their greatest compression.

Springs properly constructed will naturally increase their resistance with their compression, and need no auxiliary appliance to stiffen them or retard their proper action. It is only a question of properly controlling the quick rebound from the extreme compression.

A new device called the House patent spring recoil check is one that has been devised to perform these functions.

Its construction is of the most simple form of an automatic grip. A simple steel shell or round case, with a supporting eye on the top, is hooked to the floor or frame of the motor-car body. Inside this case is a divided piston covered with oil-treated leather which contacts with the sides of the hollow steel cylinder, a set of toggle arms butt against each side of the piston segments and a yoke over the top drawing them down is attached to the axle by strap. Thus, when the jerk upon the yoke belt is increased in velocity, the friction upon the sides is multiplied by the square of the velocity, the springs in the cylinder returning the piston to its normal position after every action of the checks.

This recoil check allows free action of the springs in the compression movements and simply controls the quick, upward rebound, preventing the springs from passing their normal position, yet still retaining all their elasticity and yielding qualities, which are so conducive to easy riding. When moving slowly, its action seems perfectly free, not in the least retarding the gentle movement of the springs. It throws no extra load or work on the pneumatic tires, yet renders it possible to use very elastic resilient springs.

Its attachment to the body and axle of the car is easily made and so flexibly arranged that any oscillating or lateral movement of the car cannot strain or break its parts.

The action is also such that the springs can be compressed by the load, but cannot separate quickly. Being entirely automatic in its action, a moderately slow movement does not cause an increased resistance, but a quick movement or jerk causes the piston enclosed in the cylinder to expand and resist the action of the springs in proportion to the velocity.

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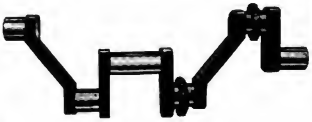
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Mark XLVII 40-45 h. p. four cylinder motor under forward bonnet; sliding gear transmission, four speeds and one reverse; jump spark ignition from storage battery; new pattern automatic carburetor; special chrome nickel steel gears, axles, crankshaft and jackshaft; crankshaft machined cold out of solid block; double chain drive; I-beam front axle forged in one piece; pressed steel frame; 108 inch wheel base; seat starting; new pattern brakes. Price, with standard body $4,500

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Mark XLVI An entirely new model 24-28 h. p. four cylinder, vertical water-cooled motor, shaft drive, sliding gear transmission, three speeds and reverse; low tension make and break magneto current ignition; special chrome-nickel-steel gears and chains; crankshaft machined cold out of solid block; I-beam front axle forged in one piece; rotary pump oil lubrication; pressed steel frame; 98 inch wheel base; double side entrance body seating five passengers. Price $3,000

Mark XLIV-2 Perpetuating Mark XLIV, one of the most successful of medium weight 1905 cars. 18 h. p. double opposed horizontal motor under forward bonnet, frame length increased eight inches, giving ample room forward of each seat, wheel base increased to 90 inches. Rear seat widened five inches, double side entrance body. An ideal family car, which will climb any hill and maintain a speed of 35 miles per hour on the level. Price $1,750

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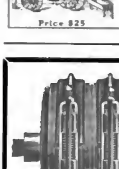
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RIVAL ELECTRIC MOTORS—THE TRAM CAR AND THE MOTOR BUS

THE development of the motor omnibus has led to a controversy between its advocates and those of the electric tramway as to comparative cheapness of operation, maintenance, and utility of the two systems.

In a report published in the United States Daily Consular Reports for July 3 statements on the relative value of the omnibus and tramway contained in various newspapers were summarized, and the conclusion was reached that the electric tramway seemed to have the advantage in cheapness and utility. The report has brought letters and publications from advocates of the motor omnibus, contending, in substance, that the newspaper statements printed in behalf of the electric tramway were incomplete and misleading.

The cost of propulsion for each ton weight of electric car was placed at 24 cents; that of the gasoline omnibus at 80 cents. This, while undenied, is claimed to be an unfair comparison, because the omnibus weighs only about one-third per seat of the tramcar weight. The motor omnibuses so far in use carry from twelve to thirty-six passengers, though forty-two seated ones are now being made. It is claimed that the operating cost per mile is but little more for the larger than for the smaller sizes. The double-decked tramcar seats from fifty to seventy passengers.

It does not seem to be disputed that the cost of rubber tires for omnibuses averages more than the cost of maintenance of car tracks, allowing for original capital expenditure. It is contended, however, that improvements, organization and increased knowledge are reducing the operating expenses of the motor omnibus. These, according to the latest official statement made for the omnibus, are 16.10 cents per mile, including maintenance and all working costs; similar expenses of municipal tramways, according to such statistics as are available, range from 14 cents to 14.56 cents per car mile.

The special claim made for the motor omnibus is its availability in certain localities and conditions where the tramway would be impossible or unprofitable. Therefore in urging its merits, it is presented less as a direct competitor of the tramway than as an adjunct to or a substitute for it. One particular field for the motor omnibus lies in towns or on routes where a sufficient number of electric cars could not be run to make a return on the capital outlay for tracks and equipments. In congested city districts such as London about the Bank of England, where cars and car tracks would presumably be a serious obstruction, the motor omnibus expects a clear field. It is remarked also that in any locality the omnibus may always vary its route to accommodate a temporary shifting of the passenger traffic, as, for instance, on Sundays or holidays, when the chief demand for transportation would be on different streets and in different directions than on ordinary business days. For limited rural service the motor omnibus is claimed to be particularly serviceable and economical, and this is especially applied to instances where railways are now using motors to link their systems with attractive country and seaside places which have hitherto been practically inaccessible except to well-to-do persons who could afford their own vehicles. For market purposes, too, the motor omnibus of a composite type is expected to prove of great utility in speedily carrying fresh vegetables, eggs, butter, etc., from farm to town.

To sum up, the claim for the motor omnibus is substantially as follows: If every pertinent consideration is given fair weight, it is but little more expensive to operate at the present moment than the tramcar, and its comparative newness leaves room for improvements which will sensibly reduce its working expense. It is practically unassailable in congested city streets.

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For family use, it is especially adapted by its extreme simplicity and ease of operation. Any man, woman or child can drive it after a few hours' practice. There is no troublesome cranking of a heavy motor, made doubly difficult in cold weather. No loading with gasoline, oil and water, no trouble with spark plugs, and, on account of their light weight, the danger of tire troubles, skidding, etc., is reduced to the minimum.

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No matter how bad they are; DO IT YOURSELF. It takes 10 minutes—costs a few cents and NO BILL TO PAY

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SOLE U. S. AGENT
International Motor Car Supply Co.
TELEPHONE, 1157-38th 41 W. 33d St., N. Y. City

THE MANUFACTURE OF BALLS FOR BEARINGS

THE applications of ball bearings have developed to such an extent in recent years, to motor-cars, motor cycles and vehicles of all kinds, as well as to a large number of industrial machines, that a study of the manufacture of the ball, the essential part, may not prove uninteresting.

In these bearings, balls form the vital element. They are, as we know, made of steel possessing very great toughness, and their temper is so fine that they can scratch glass, while their precision extends to thousandths of a millimetre. But how are such results attained? It was to answer such a question that we were led to visit a ball manufactory which is considered one of the best equipped of its class. The work, which is relatively simple, requires a very careful selection of the raw material, a particular verification, and special processes of tempering.

We first enter the raw-material department—a large hall completely filled with bars of steel of all dimensions from those of the finest wire up to bars of the size of a railway-car axle. In answer to our question as to the necessity of so large a number of sizes of steel, it is explained that for each diameter of ball a specially prepared material is required. Now, balls of normal sizes are manufactured of more than sixty diameters, and hence the necessity of such a stock of raw material.

The bars of steel are first carried to machines which give them the form of a ball. A large number of these stand alongside of each other for making different sizes of balls, and the bar of steel introduced into the side of one of them is quickly converted into relatively precise balls. Such balls are next carried to a hall of revision, where they are examined with a view to the elimination of all the defective ones, which, when discovered, are immediately sent to the scrap heap, while the balls that are found to be perfect are submitted to the operation of a first polishing in what are called "rectifying machines." These latter are so constructed as to produce not only a rotary motion, but also a constant displacement of the axis of revolution of the balls to be rectified, so that the entire surface of the spheres is in continuous contact with the abrasive material. It is particularly interesting to see how regularly this rectification is effected, and how it shapes the ball until it reaches the uniformly exact size that is desired.

In order to prevent the dust due to the polishing of the balls from injuring the operators of the machines, large aspirators constantly absorb the material, which is afterwards retained by filters.

This operation is called "dry rectification." The balls are next submitted to a second revision and are then tempered. The irreproachable tempering of the balls is the most delicate operation in their manufacture. As long as the tempering is applied to a relatively small number of balls the work is comparatively easy, since it is possible to see to the regularity of the temper of each one, and, if need be, to remedy the irregularity by certain artifices. In the manufacture, on a large scale, it is impossible to give the same attention to the temper of each ball. When it is reflected that some works daily turn out, on an average, 300,000 balls of different diameters, it will be easily understood that the experience of the workman cannot alone suffice to obtain a product of good quality. So a special process of tempering has been devised. The balls, introduced in a mass into furnaces, make their exit from the latter at the same moment at sensibly the same temperature, and are afterwards thrown into special baths.

After being tempered, the balls are again submitted to a revision, and pass into other machines which, by means of oil and a polishing material, give them a relatively smooth surface. These machines perform their work with such precision that the workmen who operate them know, recording the time consumed, the moment at which the balls should leave them.

This operation is called "rectification by oil."

The balls are now finished, and it only remains to give their surface a handsome polish. With this object in view, they are placed in large cylinders that revolve with great velocity, and in which the balls of all sizes turn in every direction in the midst of a polishing material. Herein they remain for several days, in order gradually to acquire an even finer polish. The balls are constantly watched by the workmen, and, as soon as they have the desired appearance, they are placed in other cylinders filled with leather and different materials which give the final polish and lustre.

At this moment the balls are not completely finished; but must be submitted to a sorting, in order to eliminate all those that are not perfectly calibered and polished.

After this they go to the hall of revision. Here a large number of women are employed in examining balls to see whether they are uniformly polished and perfect. For this purpose they are rolled upon what are called "revision boards," and those found to be defective are removed by means of a magnetized rod.

Owing to the improved machinery and to the care bestowed on the tempering, as well as to the quality of the raw material employed, the number of defective balls is very limited.

The balls judged perfect are introduced into the calibering machines, which consist, in principle, of two well rectified, polished and tempered conical rules of steel, over which the balls roll and between which they fall when the space between the rules corresponds to their diameter. The balls drop into different compartments, and, as it is not possible, during the manufacture, to make all of them absolutely spherical, they are passed between the rules of the calibering machines several times.

In order to give an idea of the precision of these machines, it may be stated that at the end of the work of revision the balls found in the same box do not differ from each other more than .002 of a millimetre.

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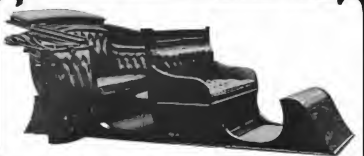
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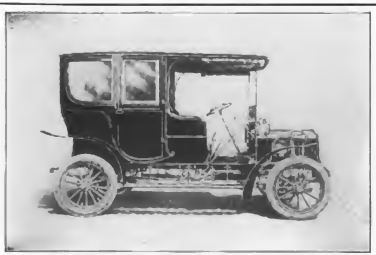
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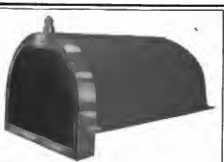
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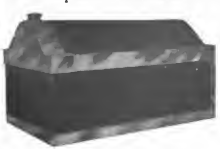
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UNITED STATES IMPORTS AND EXPORTS OF MOTOR CARS

THE National Office of Foreign Commerce publishes some interesting information in regard to the United States imports and exports of motor-cars, from which we learn that the first report upon the importation into the United States of motor-cars of foreign construction dates from the fiscal year 1901, during which 26 motor-cars, of a value of $43,-126, were imported. Since that period the imports have constantly increased, having risen from 26, in 1901, to 423 in 1904, while their value (inclusive of detached parts) passed from $47,471, in 1901, to $1,446,363 in the last fiscal year. The imports from France were 368 automobiles, valued at $1,117,494, while the number of those imported from other countries was 55, of a value of $176,666, distributed as follows: Germany, 22, estimated at $69,099; England, 13, estimated at $54,013, and Italy, 13, estimated at $34,620.

The exports of motor-cars of home manufacture have not been figured up since 1902. During that year the value of the exports of motor-cars and detached pieces was $948,528; in 1903 it rose to $1,207,603, and in 1904 to $1,895,605, while for the six months of the fiscal year 1905, of which we have the exact figures, the exportation amounted to $1,876,063, thus showing a total of more than $2,300,000 for the entire year ending in June. The United Kingdom and Canada take about three-quarters of the motor-cars exported by the United States. During the fiscal year 1904 exports of motor-cars and detached parts of home construction were estimated at $1,895,605, of which $1,020,881 worth were sent to Europe, chiefly to England; $498,704 worth to various parts of North America, especially the Dominion of Canada, and $376,125 worth to other countries.

RESULTS OF HALLE WHEEL TESTS

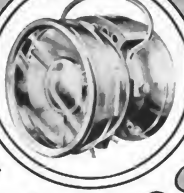
THE official report of the 4,000 mile trial which Messrs. C. S. Rolls & Co. have been conducting, under the auspices of the A. C. of G. B. & I., with a car fitted with a set of Hallé spring wheels, has now been published. The trial commenced on August 15 and extended to September 18, a total distance of 4,001½ miles having been accomplished. Lubrication seems to have been the principal matter requiring attention, and, according to the report, oil was injected into the wheels on an average twice daily. After running 1,501 miles, the off back wheel was removed and sent to the works to have new spokes fitted. After running another 1,362½ miles, the same wheel gave trouble, and was sent to works to have a new rim, tire and spokes fitted to it. The near side back wheels also required new rim, tires and spokes after running 3,179 miles, but the front wheels came through the trial with only repairs to some split spokes *en route*.

PULL IN FOOT-POUNDS AND MOTOR POWER

THE following brief explanation really resolves itself into pointing out the difference that there is between "work" and "power," since "foot-pounds" expresses the *amount* of work that is done, and "motorpower" expresses the *rate* at which that work is being performed. Assuming, for instance, that a motor were to be employed for lifting a weight of say 33,000 lbs. up vertically to a height of 100 ft., then the "work" to be done might be expressed as 3,300,000 *foot-lbs.*, whether the motor were to take one minute or one hundred minutes in performing its task. If, however, one minute only were spent, then the power would be expended at the rate of 3,300,000 foot-pounds *per minute*, and the motor would therefore be giving 100 m.p., whereas if it took a hundred minutes, the power would be exerted at the rate of 33,000 foot-pounds per minute, and the motor would be giving 1 m.p.

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of losing the confidence and good will of your customers by equipping their Automobiles with cheap and inferior lamps, when, for a trifling additional outlay, it is possible to include "E & J" *lamps* in *every* equipment?

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Every lamp is made on *honor*.

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Columbia Lens Mirror Lamps A, B, C, D



Columbia Generator No. 2 B. 34 Ounces Carbide.

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Columbia Generators are the simplest and most efficient—no excess of gas, easy to charge and discharge.

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PNEUMATIC VALVE POLISHER AND PRACTICAL VALVE LIFTER

IT is often very difficult to remove a valve in order to polish it, and the operation as generally performed with a screw driver is very troublesome. To obviate such an inconvenience is the object of the pneumatic polisher represented in Fig 1. This apparatus sucks up the valve, holds it firmly adherent to itself, and permits of the polishing being done by the ordinary method without any difficulty.

This new apparatus is used as follows: The valve is set free by removing the key fixed under the spring; the head of the valve is care-

FIG. 1.—PNEUMATIC POLISHER AND A VALVE



FIG. 2.—VALVE LIFTER: A—HANDLE; B—SUPPORT. C FORKED LEVER.



F.G. 2

fully wiped, and the base of the polisher is moistened with water or saliva, in order to render the air chamber tight, and is then applied to the valve.

The operator then draws the handle toward himself in holding the body of the polisher firmly upon the valve. As soon as the pin of the valve stem appears, an eighth of a revolution from right to left is made in order that the pin may rest in the notches formed to receive it.

In order to effect the polishing, all that has to be done is to replace the valve and proceed as with an ordinary hand brace. Since the valve does not leave the polisher, it may be removed and put back in place at will, without effort and without any difficulty (Fig. 3). After the polishing is finished, all that remains to be done is to carefully wipe the valve, which still remains fixed to the polisher; disengage the pin from the notch, and allow the valve stem to descend. The valve will then detach itself automatically from the polisher and reseat itself.

The removal of the keys that hold the springs of the valves is, as is well known, sometimes difficult of accomplishment. With the valve lifter

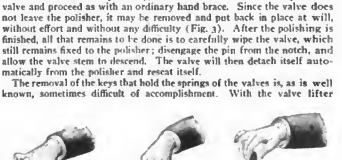


FIG. 3—METHOD OF USING THE VALVE POLISHER. FIRST ILLUSTRATION REPRESENTS PLACING POLISHER ON VALVE; SECOND SHOWS POLISHER IN PLACE AND READY FOR USE; THIRD SHOWS VALVE RESEATED AND POLISHER REMOVED

represented in Fig. 2 this operation is rendered exceedingly easy. After the apparatus is in place, a simple thrust suffices to disengage the key and permit of the removal of the valve at once.

The apparatus consists of a handle (*A*) provided with a small forked lever (*C*), which can be turned to the right or left, according to the situation of the valve. A thumb-nut permits of fixing this fork in the position desired. To the handle (*A*) is joined a support (*B*) which serves as a bearing point for the apparatus during its operation. As the handle (*A*) is hollow, it permits of the support being folded against it in order to render the apparatus more compact.

Opposite the fork there is a claw, which is used in place of the lever when the spring to be dismounted is weak. It serves also for placing the pin of the spring in the most convenient position for removal.

LEATHER belts, while largely used for stationary gas engines and other engineering practice, make no end of trouble for the motorist on the road because they have a tendency to slip, crack and break when least expected. Hence, hot bearings, overheated cylinders and other troubles of that east have been looked upon as unavoidable. A new belt made by an American maker, called the Powco steel belt, is fast taking the place of the leather belts on high-grade cars because it avoids all the objections to a leather belt. It is claimed for Powco steel that it makes the ideal belt, because, while it has plenty of give, it is devoid of objectionable stretching or breaking features, besides being as pliable as leather, and that it will last as long as the car.

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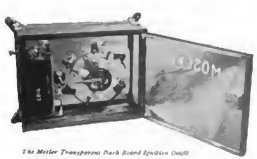
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The **"CHELSEA"** *Yacht Wheel*

STRIKING SHIP'S BELL CLOCK

SIZE (DIAL) 4¼, 6, 8½, 10, 12 INCH
PRICE, $84, $100, $125, $150, $175
Height (about) 12, 17, 24, 30, 32 inch

8-DAY FINELY FINISHED, suitable for use in COUNTRY ESTATES, CLUBS, etc., or for a PRESENT to your YACHTING or NAVY FRIEND. Fine PRIZE for REGATTAS

Good opportunity on metal base for Special Engraving, etc. Also Ship's Bell Clocks in elegant Wood Mantel Cases for use in Parlors, Libraries, Hallways, &c.



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8-DAY—HIGH GRADE

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2½ inch (Dial Size), Auto-Clock	$26
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All four of the above Clocks are in DUPLEX (Pat. appl'd for) Polished Cast Brass Cases; most thoroughly water-proof case on the market.

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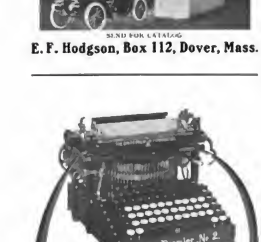
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REVERSION IN TYPES

THERE is a certain nationality in styles of motor-boats, beyond a doubt, says the *Yachtsman*, of London. England and America run pretty well together, except that our Yankee cousins have tendencies in the directions of bizarreric and weirdness in the designs of stern. France and Belgium run pretty closely on the classical Tellier shape—a well-rounded forebody, and afterbodies wide in the extreme, finishing off with a curved-off transom or a flattened V. Comparison between the French destroyers and the French motor-boats at the chief foreign fixtures last year was interesting, since it showed unmistakably the source from which French designers of motor-boats had drawn their ideas. Motor-boat designers drew on precedent created by the designers of torpedo craft; now certain steamer builders have drawn on motor launch practice. The new Belgian turbine steamer, *Princesse Elizabeth*, is a case in point; her lines are absolutely those of the best modern launches, torpedo stern, flat easy run, and all complete. In fact, a replica of her hull is under construction as a motor-boat, and even reduced proportionately looks perfectly fair. Whatever the beauties of a torpedo stern are in a small boat, they are monstrosities in a large steamer. This particular vessel is remarkably easy in a following sea, and her shallow draft aft makes her answer her helm remarkably easily. Its provement always seems to follow a cycle, and the causes and effects of modern motor-boat design form a curious example of the fact.

HOW DUST CAN BE LESSENED

IT will be years before local authorities will free us from the curse of dust by making dustless roads. In the meantime the demon of dust will be with us, to our perpetual annoyance, and to bring down on motorists the anathemas which ought to be hurled at the culpable road authorities. As practical men, therefore, and the greatest sufferers from the dust nuisance, it behooves us to do the best we can to alleviate it by any practical modifications in the design of our motors which may be proved to be efficacious. A series of trials having this end in view have recently been made on a very dusty stretch of the old Bath road in England, which established several important general principles. Each car in the experiment was sent over the route four times at different speeds, and photographs were taken of every incident. First, it was established beyond question that certain cars raised more dust than others, and they did this at whatever pace they were driven. Second, it was made quite clear that there were conditions in design and build which may be stated in their order: A tire with a narrow tread raised less than broad-tread tires; a car whose body was high off the ground raised less dust than one with its body lower down; one with its mechanism and side chains encased raised less than when wholly or partly uncovered; and finally, the removal of the front mud guards effected a most noticeable improvement, even the fastening of the flaps of the mud guards to the step removing quite a disturbing influence.

FRENCH MOTOR CENSUS

LE *Journal de l'Automobile* gives the following figures from the documents of the Minister of Finances:

On December 31, 1904, there existed in France 1,580,458 bicycles, 27,435 motocycles and 25,017 motor-cars. It is well to recall, in this regard, that in 1903 there were in France but 1,310,233 bicycles, 19,866 motocycles and 19,886 motor cars.

As the total population of the country since the last census, when it was 38,961,945, has varied very little, it follows that there were in France, on the 31st of December last, about 390 bicycles, 7½ motocycles and 6½ motor cars to 10,000 inhabitants; or, to put it in another way, 1 bicycle to 26, 1 motocycle to 1,420 and 1 motor car to 1,557 inhabitants.

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BORATED TALCUM
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HESS-BRIGHT BALL BEARINGS

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GORDON-BENNETT CUP RACE
Repetition of all previous G. B. and Vanderbilt events.
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If you wish to buy or sell a second hand car, see Motor Bureau page 16.

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REO

REO Touring Car, 16 horse-power, 1600 pounds, 90-inch wheel-base. Four or five passengers. Side-door detachable tonneau. 35 miles per hour. $1250.

Five Prizes out of Seven

A REO 16 horse-power 'bus with the same engine as the touring car shown above won the National Trophy and two other prizes in the New York Motor Club's great six-day Economy Test, by carrying its load 682 miles at a total cost (including ferriage) of $2.93 per passenger.

The REO four-seated Runabout (price, $675) won the gold medal for cars up to $1500 and one other prize, carrying four passengers 682 miles for $3.33 per passenger.

REO Cars not only show the winning speed and power which keep them at the head of their class in every racing and climbing contest they enter, but their remarkable convenience and practicality exactly meet common-sense requirements and make speed and power worth while.

Freeze-proof, jar-proof radiator, perfect and positive oiler, simple operation and simple, enduring strength are some of the features which make REO the car that practical motorists want.

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This machine is guaranteed to make 75 to 85 miles on one charge. Five speeds forward and reverse, geared up to 19 miles per hour. This large mileage is not due to "freak" batteries, but to the general superiority of design and construction throughout. Exhibit at New York Automobile Show, 69th Regiment Armory, basement.

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The
SOULES DELIVERY WACON



Price, $1,500

Power, strength, simplicity of construction and durability. These features, together with moderate price, are what must be combined to make the ideal delivery car, which is to carry a load not in excess of 1,500 to 2,000 pounds.

THE SOULES DELIVERY WAGON

is equipped with a double opposed engine, with 5 x 5½ in. cylinders, located under the hood. Sliding Gear Transmission in unit with engine, two speeds forward and reverse. Practically all working parts of the machine are directly under the hood, or the floor-boards under the operator's feet, which is the only form of construction suitable for delivery wagons, as it would not be practicable to remove the load in order to make repairs, if necessary.

Dealers throughout the country thus far have failed to fully appreciate the desirability of building up the commercial end of the motor car business. The day is not far distant when it will be more satisfactory and profitable than the pleasure vehicle, and the agent who takes hold of this branch of the business early will get his experience in time to reap the reward of a big boom later, besides adding a fair amount to his profits at present. **The Soules Delivery Wagon** is the only car to-day of a moderate price, which is built for the purpose for which it is intended. It is not a pleasure vehicle chassis with a delivery wagon body, but is built for one purpose—that of carrying a paying load of at least 1,500 to 2,000 pounds.

Correspondence Solicited

SOULES MOTOR CAR CO., GRAND RAPIDS, MICH.

THE VIAGRAPH

THE viagraph, as its name implies, is designed to register the irregularities of a road. Through it the most imperceptible depressions and projections are amplified and recorded on paper in the form of a durable tracing. Fig. 1 shows the principle of operation of the apparatus, which consists of a frame provided with a wheel which rests upon the ground, and of a simple registering device attached to the frame at *A* and *B*, which constitutes the two fixed points of the system. The frame is greatly elongated, but of little height. The registering mechanism comprises a lever *L*, capable of oscillating at one of its extremities around the point *B*. The other extremity carries a loose wheel, *M*, which, through its own weight, rests constantly upon the surface of the ground, of which a profile is to be taken. All the asperities or changes of level of the road have the effect of causing the lever *L* to undergo oscillations that are transmitted through the jointed rod *I* to the second lever *L'*, which carries at its free extremity a style that inscribes a diagram upon the paper of the registering cylinder *E*, revolving at a uniform velocity.

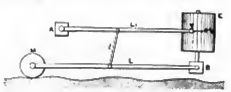


FIG. 1—THE VIAGRAPH

The use of the apparatus is not complicated. The operator simply drags the viagraph behind him by means of a cord, and the apparatus inscribes its tracing automatically.

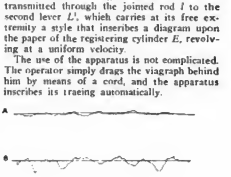


FIG. 2—THREE TYPES OF DIAGRAMS MADE BY THE VIAGRAPH

L1—Tracing Lever. A—Axis of Oscillation of the Lever L1. M—Wheel Resting upon the ground. I—Rod connecting the two levers. L'—Lever carrying the Wheel. A—Axis of oscillation of the lever L. E—Registering Cylinder.

In order to compare two roads or two parallel sides of the same road, it is very evident that it will be necessary to register the same length of road in each case. In order to render the thing easier, the apparatus carries, in addition, a totalizing counter, which rings automatically when the distance for which it has been regulated has been reached, and thus notifies the operator.

The second figure reproduces three types of characteristic diagrams made by the viagraph, and giving the profile of three roads, of which the different state of preservation may be judged at a glance. The apparatus is capable of furnishing valuable information as regards the choice of racing "circuits."

Brazing Brass.—It is not generally known that ordinary brass may be brazed by the use of a soft variety of spelter. On cars which are subject to much racking or vibration, it is impossible to make ordinary solder hold unless the soldered parts are given very liberal bearing surfaces, which is not always possible. By the use of this soft spelter, brass parts, which would melt if hard spelter were used, may successfully be brazed together so that they will resist any ordinary usage.

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We furnish the common style with lace fastening if desired.
Lamp and auto-covers, tool rolls, leggings and other auto fabric supplies.
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DASHES, ETC.
THE MAYO RADIATOR CO.
NEW HAVEN : CONN.

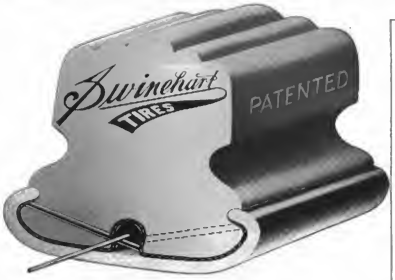
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A tire built to replace the pneumatic and carry you over any road without tire trouble.
No excessive vibration.
This tire is fully guaranteed.



Condition of roads no barrier to these tires.
Won't come off.
Will fit Clincher Rims
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REDUCE UPKEEP OF CAR

Over 2,000 owners who were formerly prejudiced against solid tires are now staunch friends of the Swinehart Tire and maintain that the machinery of their cars has not been injured in the least and recommend the tires to their friends.

FOR AN UNBIASED OPINION ASK THE USER OF A SWINEHART TIRE

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Discriminating and Appreciative

Mr. E. P. Blake, Manager of the Haymarket Automobile Station, Boston, and New England Agent for the well-known Jackson Cars, manufactured at Jackson, Mich., considers that the automobile equipment for those cars cannot be too good. He has consequently ordered all the cars for the New England states, for the season of 1906, to be equipped with Imported

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By so doing he will satisfy the growing demand of discriminating automobilists. Automobile dealers throughout the country who wish to do as well by their prospective purchasers would advance their interests by specifying "CONTINENTAL TIRES" on the cars for next season's delivery.

The Continental Caoutchouc Co.

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EMIL GROSSMAN, Gen. Mgr. Factory: Hanover, Germany

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If you want to buy anything, if you want to sell anything, if you want a Chauffeur or Mecanicien, if you want anything in the world of motoring, you want

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A little "Want Advertisement" or MOTOR MESSENGER in the next issue of MOTOR will give results to fit your needs.

In a few words, write your "want" and mail it to MOTOR with the price of the MOTOR MESSENGER at

5 CENTS A WORD

THE LONDON SHOW

(Continued from page 56)

Nearly all the cars had dashboards bare of fittings, save rows of sight-feed oilers, control now being largely from the steering wheel. Lubricating devices must have received considerable attention during the past year abroad. Positive mechanical feeds were seen everywhere.

Ease of access to crank cases and gear boxes was in evidence, as shown by the large number of inspection plates attached to these cases. Outside of the few racing cars on which wire wheels were shown, the wooden type of artillery wheel reigned supreme.

The new six-cylinder, 50 m.p. Panhard in its chassis follows the regular standard Panhard product. The motor has separate cylinders and is made in two styles, one with steel cylin-



BEAUFORT BUSINESS WAGON CHASSIS

ders, with copper water jackets brazed around them, the other style having each cylinder cast integral with its jacket. The valves are on opposite sides, with their covers held by yokes. The motor is carried on an angle iron underframe as far as the first transverse member behind the dash. The Eisemann high-tension magneto is still used, the ignition plugs being fitted horizontally in the inlet valve chambers, which it will be seen are connected by a straight copper pipe connecting with the carbureter. The carbureter is, of course, of the Krebs type, with its main throttle valve governed automatically by hydraulic pressure from the gear-driven circulating pump, as heretofore. In the other



16-12 M. P. ROVER MOTOR. 4 CYLINDERS IN ONE CASTING

models five sizes were shown, 8, 15, 24 and 35 m.p. The 8 m.p. model is their three-cylinder car.

All these cars are now fitted with ball bearings in the wheels. The Eisemann magneto has been specially constructed so that the magnets rock bodily about the armature for timing. On the models above 24 m.p. push pedals are fitted instead of downward-pressing pedals, and on all the new models the steering column is carried through the dash.

The new 60-80 m.p., six-cylinder Napier is one of the best cars that the famous Acton

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PREST-O-LITE GAS TANK

A MAN'S LIFE

and the safety of his Automobile depend on how far his Headlights illuminate the road at night. A narrow road, with deep ditches on either side; a deep hole in the center of the road; an obstruction on a country road—where they never have danger lights—are all made as "Plain as Day" when Prest-O-Lite is used to illuminate the road.

No disagreeable odors; no leaking gas; no attention required; light instantaneously.

All dealers handle Prest-O-Lite Tanks. Empty tank exchanged for full one by any dealer. Recharged at small cost.

THE PREST-O-LITE COMPANY *330 N. Illinois Street INDIANAPOLIS, IND.*

Exclusive licensees under patents of The Commercial Acetylene Company, New York.

Motor

GILBERT MANUFACTURING CO.

See us at Madison Square Garden—Space 173

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TIRE BANDS



INNER TUBE CASE

AUTOMOBILE FABRIC SUPPLIES

SEND FOR CATALOGUE Gilbert Manufacturing Co., New Haven, Conn. *FOR SALE BY LEADING FIRMS*

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DIETZ

Oil Motor Lamps for 1906

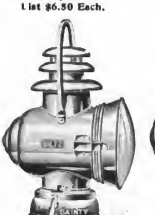


Dainty Tail. List $6.50 Each.

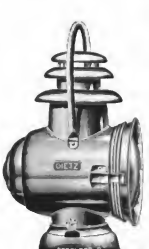
The Highest Grade Lamps in Operation, Workmanship and ——Style——



Peerless R. List $7.00 Each.



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Peerless O. List $5.50 Each.

Our new styles for 1906 are the acme of finish, and your car will not be as complete as it should be unless you have it fitted with Dietz Lamps.

As in the past Dietz Lamps are furnished with the most convenient devices for operation of any on the market. They have drawn aluminum reflectors easily removable for cleaning. The reflectors are properly shaped and focussed so as to get complete advantage from the flame.

In securing convenience of operation, beauty of form and excellence of workmanship, we do not overlook that most important point—the ability to Stay Alight and give a good light under all circumstances. Send for booklet.

R. E. DIETZ COMPANY, 37 Laight Street, New York

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Packed only in 10 lb. cans. Price $2 each. Discount to dealers in case lot of 12 cans.

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THE HIT OF THE SEASON

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Auto Cover and Top M'f'g Co., Inc.

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1908-DESIGNS NOW READY

Hubs equipped with Roller, Ball or Friction Bearings. Steering Devices fitted to all Hubs. Steel Rims.

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For pale, wan, ill-nourished skin, use Rosaia Cream —$1.00 per jar. Express prepaid on $2 order by

ITHACA TOILET CO., Ithaca, N. Y.

works have produced. The motor presents considerable variance from the well-known previous Napier ideas in the design of the cylinders, which are cast in pairs in one piece with their heads and water jackets, all the valves being on one side, the inlets paired off between the exhausts, and a single eam shaft. The motor is now of the short-stroke type—that is to say the cylinder is 5 inches bore and the piston stroke 4 inches, the bulk of the heads being spread out lengthwise from the cylinders to the side of the valve chests, making these larger and giving more room for the bigger valves.

A radical change has been made in lubricat-

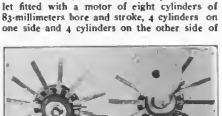


LANCHESTER CAR WITH BODY COVERING WHOLE CHASSIS: HORIZONTAL MOTOR

ing systems; sight feeds and oil pipes seem to be nearly totally abolished. The only thing on the dashboard is a tubular sight oil gauge and a pressure gauge, showing the amount of exhaust pressure which is attached to the gasoline tank, and an accelerated hand-operated air pump. The synchronized-ignition system drives spiral gears, the shaft being raised or lowered vertically to advance or retard, quadrants being done away with.

A slight change has been made in the steering gear to do away with the wear on the worm and sector. The working gear is now encased in a threaded sleeve, which may be raised or lowered, but is not free to rotate. The propeller-shaft brake is of extra large size and water cooled, the propeller shaft having a large universal joint and encased in a sleeve forming part of the differential and transmission-gear case.

The *clou* of the show, so far as the motors were concerned, was the Rolls-Royce Landaulet fitted with a motor of eight cylinders of 83-millimeters bore and stroke, 4 cylinders on one side and 4 cylinders on the other side of



MIDDLETON PNEUMATIC HUB

the crank chamber, developing 20 m.p. The cylinders are inclined at an angle of 45 degrees, with a vertical center line, and at 90 degrees with each other.

The frame of the Landaulet is of channel-cambered steel, with cross members carrying the motor and the change-speed gear box without an underframe. In a ear of this character bonnet space forward was out of the question, so the motor was placed under the footboard, which was raised some few inches from the top of the frame. The idea of the eight-cylinder construction with such small size cylinders was that the explosive impulses might be as small, as light, and as close together as possible in order that an almost continuous torque might be had, so that by having eight cylinders, and arranging them as described, the crank shaft receives a rotary impulse every 90 degrees—one-quarter of a revolution—the impulses and compressions must, necessarily, overlap each other in a much more regular manner than is even possible in a six-cylinder motor, and which type has been regarded as

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WHO·KNOWS·



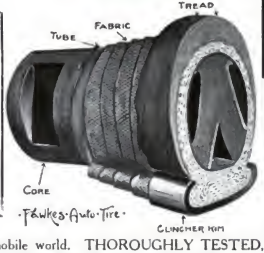
Cudahy, Wis., Dec. 26th, 1905.

The Milwaukee Rubber Works Co., Cudahy, Wis.

Gentlemen:—In reply to your inquiry of the 20th inst. as to how I like your new Fawkes Clincher Tire—I say that I have been using them on my Cadillac Touring Car and have had more genuine satisfaction out of my automobile than I ever had before, and I have run a machine for several years. As you know I had your Q. D. rim on my car and I must say that I like your clincher rim and that you have put out the most satisfactory tire I have ever used, by tire is a far ahead of anything I have ever used heretofore, and I have used all makes of pneumatic—that I would not think of using anything else and could use strongly endorse and recommend them to users of automobiles, particularly physicians. My practice is such that I must have a tire that will stand the strain of very rough roads, and as I say, the Fawkes tire is the only tire that will give me satisfactory service will satisfy the great majority of people. So far as the riding qualities are concerned, will say that I had in my machine some of the most practical dealers and users of automobiles in this part of the country, one man he particularly being a practical chauffeur, and they all pronounced it a perfect riding tire as well as all others, was enthusiastic over the easy riding qualities and the general ease of the tire.

I take great pleasure in giving you this statement for your tires have been such a success as to warrant me in saying that I would be glad to let others who are now afflicted with "tire troubles" as I was to know that there is a tire that really does ride easy—the Fawkes.

Yours very truly, (Signed) A. C. MILLER, M. D.



BURSTED AUTO TIRE KILLS PHILADELPHIAN

Philadelphia, Nov. 8.—..... of the firm of ....., was killed, and Mr. and Mrs. ..... were injured late yesterday in an automobile accident near Atsecon, N. J. They were going at a rapid rate when a tire burst, upsetting the machine.

From the *Denver Post* of above date.

but that YOU may be the NEXT ONE to be KILLED by a "BUSTED" PNEUMATIC TIRE? You might as well be killed instantly as worried to death with TIRE TROUBLES. Our new 1906 **FAWKES CLINCHER** tire is the sensation of the automobile world. THOROUGHLY TESTED, FULLY GUARANTEED. Fits *Standard Clincher Rims.* Orders coming rapidly. Send yours in quick. Will be rushed after the Show.

New York Auto Show, Madison Square Garden, Jan. 13-20, Space No. 190.
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MILWAUKEE RUBBER WORKS CO.
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SEASON OF 1906



OPEN STEAM CURED

STRONG and TOUGH

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The Best Tire Made

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is the leader of Jump Spark Plugs. **It is the only Plug that can be cleaned of soot** or oil **without removing it from the engine.** Costs no more than the common kind which it outclasses in every feature. See us at New York Shows. Write for Bulletin "O."

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BEST MADE FOR AUTOMOBILE CONSTRUCTION.

SEND SPECIFICATIONS

WE QUOTE PRICES

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BRANCH OFFICES - NEW YORK - CHICAGO.

coming pretty close to perfection in this respect. The peculiarity of this eight-cylinder motor is that it needs but a simple, short crank shaft. Absence of noise is had from these small cylinders, because all the moving parts are very light. The exhaust volume per cylinder is small, and the almost continuous discharge is itself an aid to muffling.

A peculiarity of the construction of this inclined motor is that although the cylinders are inclined, the valves are vertical. This removes a great objection to inclined cylinders, because the present construction produces an extremely short port—a desirable construction. Each cylinder has its inlet and exhaust valves side by side, operated by the same cam shaft. The ignition is, of course, synchronized, but as the problem of firing eight cylinders in rotation



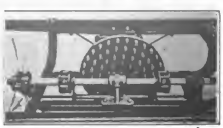
PHOENIX SMALL CAR. STANLEY SHOW

was too much to ask of one coil and trembler, each set of four cylinders has its own coil, its own distributer, the distributers being set one above the other on the distributer spindle.

Power is carried through a clutch and a change-speed gear, with three speeds forward and reverse, but it is claimed that the car may be started and driven on the high gear except upon very steep hills. The drive is by a propeller shaft to bevel gear on the live axle, the road wheels running on outward extensions of the live axle sleeves, the axle having nothing to do but to revolve the road wheels.

Most ingenious is the steering method. The steering standard runs backward and downward from the steering post to a steering box carrying the usual worm and nut, the steering standard being rotated by the steering post by way of a special bevel gear, enclosed in a gear box near the center of the steering-wheel post.

The Olympia show had, in addition to the pleasure cars, a complete motor-boat exhibit, and a very interesting exhibit of heavy motor business wagons, which were largely out of place there, as they are at every show of this kind, our shows being regarded as rather a



QUADRANT ROLLER GEAR

society function, than for displaying business motor wagons. Besides that, lack of room prevents the maker of business motor wagons from displaying his complete vehicle, which is necessary in order to show his body room, and his chassis separately, and which is necessary to show the details of his motor and transmission construction.

Omnibuses were largely displayed. A Vanguard, with an enclosed roof, such as is used by the London Motor Omnibus Company, had a chassis built by the De Dion Company, using a motor of 28 m.p. having four cylinders. The motor is placed in front, the transmission gear at the rear, the drive being by live axle and cardan shaft.

A Maudsley omnibus, big enough to seat 34 people and driven by a 40 m.p. motor, was one of the most original cars in the show. The

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The JONES Combination SPEEDOMETER-ODOMETER (1906 MODEL)

not only shows the speed of your car and registers the season mileage up to 10,000 miles, but has a three-figure "Trip" attachment which registers the mileage up to 100 miles. A touch of the button *instantly* resets the "Trip" column to zero, as in a stop-watch.

In both the Season and "Trip" registers the miles are shown in plain black figures and tenths of miles in red.

AN ADJUSTABLE SHAFT CONNECTION permits of passing the Shaft through the floor; through or around either end of the dash.

THE DASH BRACKET occupies a very small space on the dashboard, and is adjustable to permit of the instrument being set at any angle desired.

Speed is indicated and mileage cumulatively recorded whether the car go forward or backward.

Full description of our 1906 combination Speedometer-Odometer and all other instruments in our new catalog—without question the most artistic catalog ever compiled for an automobile accessory.



JONES SPEEDOMETER, - - - 135 West 32nd Street, New York



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MOTOR APPAREL
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is known throughout the world

Every variety of garment in furs, leathers, cloths, silks, satin-gums, cravenettes, etc., tailored-to-order and ready-made Scandinavian Furs are known for their beauty, variety, perfect matching and finish.

Scandinavian Leathers are the finest in the world, being prepared by the expert tanners of Sweden and Denmark whose work has never been equalled.





The largest stock of out of door garments in the United States is on constant exhibition at our warerooms and a cordial invitation is extended to every one to call and examine these garments which represent the finest samples of the greatest tailors and modistes in this country and Europe.

Scandinavian Garments will be exhibited at the Automobile Show (January 13th to 20th), Room L, in the 69th Regiment Armory. To those unable to call at our salesrooms we shall be pleased to send our new catalogue C 200 cuts free.

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WHY?

It is the only axle lubricant.
It is the standard—note "Albany" lubricant.
It is always uniform in quality.
Can be used in any style or make of Compression Cup
It avoids rust and reduces friction.
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It is the best lubricant for use in cold condition.
It is the cheapest and cleanest of lubricants.
IT IS USED BY MOST MANUFACTURERS OF AUTOMOBILES TO START THEIR NEW MACHINES.
It can be purchased the world over from Engine and Mill Supply Houses, Hardware and Oil Dealers.

Use No. 1 grade for Winter and No. 3 for Summer. For Transmission or countershaft gears use No. 1 in Summer, and No. 0 in Winter. The quality of the grades is the same, the difference is only in consistency.

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WARNER DIFFERENTIALS
"A MECHANICAL MASTERPIECE"
Large Variety of Sizes and Styles
Both Sprocket and Bevel Drive
We will make any size or ratio of Bevels or Sprockets you want
Steering Device Absolutely Positive
Three Tooth Always Engaged
Best Drive Differential
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"LACOSTE"
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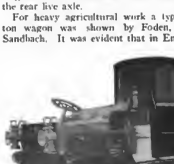


The Motorist whose car is equipped with the
WEED CHAIN TIRE GRIP
doesn't care a snap about snow or ice or mud or sand, or steep hills. Safe, easy travel under all circumstances are assured to users of this ingenious device.
Easily applied, requires but little car room and the cost very moderate considering the great advantage.
"As necessary as gasoline"
Weed Chain Tire Grip Co.
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motor had four cylinders, cast in pairs, the water jackets having manholes for easy access, which is a necessity in very heavy vehicle work. The crank-shaft case was also fitted with side openings and covers, providing for an inspection of the cranks and connecting-rod bearings.

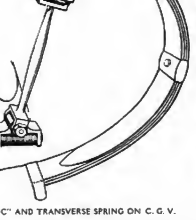
A steam wagon shown was the Clarkson, having a horizontal engine and a flash steam generator, the Straker-Squire omnibus and a Wolseley chassis, fitted with a horizontal two-cylinder motor, driven by silent Renold chains to gear box and differential, and from there to the rear live axle.

For heavy agricultural work a typical five-ton wagon was shown by Foden, Ltd., of Sandbach. It was evident that in England, at



PRIVATE MOTOR CAB—14 M. P.

least, a cast-iron-fired gasoline motor is paramount for omnibus use, the sole exception being the Chelmsford steam omnibus, designed by Mr. Clarkson. All the heavy wagons used wooden wheels of the artillery type, but the question whether it is better to employ a dished wheel or not remains unsettled by the show. Nearly all the driving wheels were dished, but the show revealed the fact, as experience has shown, that a spoke built at nearly right angles to the axle, which is strong enough to carry a load and to drive the vehicle, should also be strong enough to stand the lateral or side strain put upon it. A few cars had cast-steel wheels. A new wheel shown on an omnibus chassis by the FIAT Company, had two dished-steel plates riveted together, each being



"C" AND TRANSVERSE SPRING ON C. G. V.

flanged over at the top so as to allow of the insertion of a wooden rim over it, to which the tire is fastened. Such wheels, it is said, are largely used in Italy. Nearly all the business wagons used semi-elliptical springs.

Frame construction on the business wagons was divided between those made of pressed steel and others made of steel channel bars of standard sizes. The sectional shape, it may be said, is the same in both methods, but in the pressed-steel shape it can be broadened and stiffened where required, while in the rolled channel shape it can only be done by using

SPARK PLUG FALLACIES
Any Good Spark Plug will do.
DANGEROUS ERROR!



Over three years ago we brought out the famous NEVER-MISS just because other Good Plugs did not maintain that high standard of efficiency demanded by the exacting motorists which is so essential to auto and motoring satisfaction. NEVER-MISS won its way into popular favor at once. 100,000 sold in 1905. Our 1906 is by far the best plug on the market to-day. We can prove it. Our Coils, Battery Connectors, Chain Tools, Volt Ammeters and Terminals all merit their name and favor. Our 1906 Catalogue for the asking.
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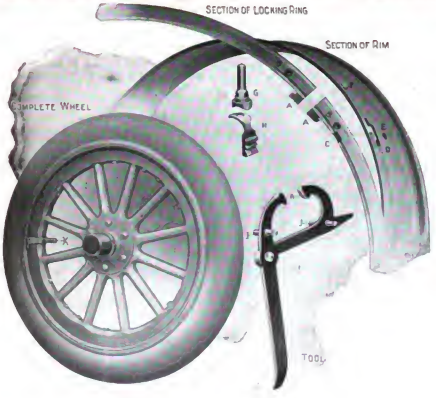
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And a visit to our Exhibit at the New York Automobile Show, Madison Square Garden, will afford you the opportunity to see our claims proved.

Perhaps you may wish to make dead sure and detach and attach the tire yourself. It is a pleasant little pastime with all the old time, hard work features cut out. You will enjoy the experience and be impressed with the fact that the Goodrich Quick Detachable Tire and Rim is a great achievement in automobile tire building.

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THE BAILEY "WON'T SLIP" TIRE. Regular Goodrich construction, but provided with the Bailey "Won't Slip" Thread. Prevents slipping, slewing or skidding.

Rims branded in the channel with this copyright mark have been inspected and pronounced perfect. We guarantee our tires only on rims so branded.

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Guaranteed—a Horse-power for Every 75 Pounds Weight

35-40 H. P. : : Seats 5 Persons

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We shall be at the A. C. A. Show, 69th Regiment Armory, Jan. 13th to 20th

Send for Catalogue.

ARDSLEY MOTOR CAR CO. : YONKERS, N. Y.



extra plates to take up the extra strain due to the spring drive.

Transmissions were there in a great variety of types, the leading type being the changing gear of sliding tooth wheels, having a propeller shaft, driving a transverse differential gear shaft, transmitting the power to the rear wheels by chains. If there were few steam omnibuses shown, then it may also be said that there were few steam lorries shown. This may, however, be due to the fact that there will be a larger display of motor business wagons at the Agricultural Hall show in March, so that less than one-third of the steam-vehicle makers showed at Olympia, among these makers being the Straker, Coulthard, Ellis, Foden, and Thames.

Water tube, fire tube and locomotive boilers were shown, the last named being the most popular, as are compound engines.

In the motor-boat section the French marine-motor industry was represented by the famous racer, *De Dietrich II*, the hull being fitted with an 80 m.p. De Dietrich motor. Her length over all is 40 feet. Brook & Co. had a 25-foot cruiser, fitted with a 14 m.p. three-cylinder motor, and a Maisner-reversing propeller, besides a number of other Brook motor-boats. The Wolseley Motor-Car Company showed a 40-foot cabin cruiser, *Joan*, built of mahogany. It had its motor set well forward, it being of the vertical type, with four cylinders, 6-inch bore and 7-inch stroke.

The Immisch boat was designed by Mr. Linton Hope and fitted with a 6 m.p. twin-cylinder motor.

An international combination was a thirty-foot river launch, with a hull built by Saunders to the order of S. F. Edge, and fitted with a Panhard-Levassor motor, the bronze stem head of the boat being moulded in the form of a Phœnix, the emblazonment of the great firm of Panhard & Levassor.

L'Auto, of Paris, sums up the general tendencies found in the motor-cars exhibited at the Olympia show thus: "The four cylinders are becoming commoner and commoner, but numerous manufacturers are exhibiting six cylinders. Ball bearings are in constantly increasing favor. Carburetion has been the object of numerous studies, and the struggle begun a long time ago between the different methods of ignition is turning decidedly to the advantage of the magneto.

"Although some systems of transmission, more curious than really interesting, have been presented, it is permissible to assert that the use of the cardan, or shaft drive, is becoming general. The same remark may be made concerning the double sliding gear of the speed-change gear, now adopted by the majority of the large houses. The metal to metal clutch is applied upon a very large number of chassis, but has not yet displaced the orthodox type with leather-faced cones.

"As regards the power of the vehicles, the great majority of the latter are of 10 m.p., usually with four cylinders. It may be observed, however, that in the carriages of this class the motor-power has been seen to increase rather than the price to diminish.

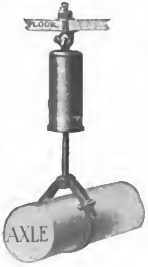
"Horizontal motors, although relatively not very numerous, present a notable interest, because of the facility with which they can be adapted to chasses provided with closed bodies, of which there are a large number on exhibit at the Olympia.

"Let us add that the exhibition includes some novelties, among which is a motor-car ambulance ordered by the War Office and constructed with a view to carrying six patients and a guard; a motor-hack, constructed by the Vauxhall Company, and soon to be set in operation in the streets of London; a Daimler royal motor-car, etc. Cheap vehicles are not numerous at this exhibition. The orders for carriages worth about $2,000 are too numerous to allow manufacturers to bother with lower-priced ones."

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A Spring Recoil Check





An automatic, frictional device perfectly controlling the recoil of the springs.

Its attachment to the body and axle of the car is easily made and so arranged that it is flexible, so that any oscillating or lateral movement of the car or running gear cannot strain or break its parts, and no oiling or adjusting is required.

A protection against broken springs.

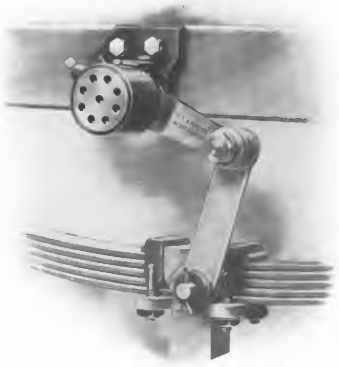
Prevents the quick recoil over rough places which lifts the rider from the seat and makes travel fatiguing.

Permits the free action of the springs over smooth roads, but steadies the movement of the car over rough places, and to a large degree relieves the weight from the tires when striking severe obstructions in the road. Makes fast riding, with comfort and safety, possible.

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Dec 7th

CHICAGO EVENING POST

MYSTERY IN NEW FUEL

"Energine" Proves Superior to Gasoline in Test With Automobile.

GIVEN A PRACTICAL TRIAL.

Driver Webb Jay Shows He Is Not Altogether Cured of Racing Habit.

"Energine," that mysterious motor fuel that comes from Cleveland, was given a severe test in Chicago yesterday by Kelly & Hunter of the Northern Automobile Company, and first honors in the bout between "Mysterious Energine" and "veteran Gasoline" were obtained by the former. The veteran, who has been in the ring much longer than "Energine," probably will insist upon a return match. It will be given.

Taking a touring car from stock the Northern agents gave the chauffeur a gallon of the new fuel and instructed him to go as far with the measured supply of new fuel as he could run the machine. He was provided with gasoline with which to make the return trip. Care was taken to measure exactly the amount of gasoline required to return the car to the exact starting point.

It is said the chauffeur's measurement shows that it took two gallons of gasoline to return the car, with the exception of about a teaspnful of the fuel left in the tank. The trip took the car a little north of Evanston.

WEBB JAY IS

What

This is Evidence!

Send for our Book of Fuel Facts

The Energine Co. Cleveland O.

THE ANTI-RETURN CRANK

ENGINEERS have for a long time been trying to find a method of preventing the accidents due to the kicking back of the starting crank at the moment of starting a eytinder-fired gasoline motor. Such kicking generally takes place from the fact that at the moment of stoppage it has been forgotten to bring the handle that controls the spark-advance to the retarding position. Now, in the haste of starting, such neglect is apt to be overlooked, and hence the necessity of a crank, so arranged that the person who does the starting shall not, in any case, have to fear the consequences of his heedlessness.

But the problem to be solved offers a certain difficulty. In fact, on the one hand, the action of the arm that carries along the motor in the normal direction of revolution, and, on the other, the violent reaction that takes place in an explosion in return, cause all the starting parts to work in an identical manner.



FIG 1—MANIVILLE ANTI-RETURN CRANK

The anti-return crank surmounts this difficulty by means of an ingenious and very simple contrivance, without the use of a spring or of any piece capable of getting out of order. The apparatus consists of three parts: (1) of a crank, properly so called, and its click; (2) of a notched disk; (3) of a free wheel.

The crank is mounted loose upon the shaft, forming a prolongation of the motor shaft. The disk, on the contrary, is screwed fast to the same shaft. The toothed click, *D*, is connected on one side, through its extremity, with the disk, in a notch of which it engages, and, on the other side, through its toothed sector, with the external toothed part of the free wheel *B*. The hub of this wheel, which is capable of revolving only in the direction of normal running, is screwed to the lug, which is fixed to the chassis and supports the apparatus as a whole.

The chauffeur, on revolving the crank in the direction of the running of the motor, sees the extremity, *D* (Figs. 2 and 3), of the click apply itself to the periphery of the disk, *C*, in consequence of the slight resistance of the friction of the free wheel. Such resistance, through the engagement of the toothing of the free wheel, is transmitted to the click. This latter, at a given moment, engages one of the notches, *C*, and the crank thereupon carries along the disk, *C*, the central shaft, *F*, and the shaft of the motor. The compression is thus

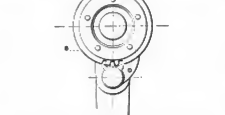


FIG 2.—VIEW OF THE CRANK ON THE MOTOR SIDE. B—FREE WHEEL.—D. CLICK.

passed (even several times, if necessary) for the starting.

In order to render the motor independent as soon as it is under way, care has been taken to provide for a movement of longitudinal recoil of the shaft *F*.

Let us now suppose that a return explosion occurs. Then the whole, previously in motion

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This has many improvements—iron, waterproof: wiring is accessible by taking cover, whether zero contacts. Cover removable by removing two screws, exposing all wiring. *Same Price as Heretofore.*

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THREE-TON GASOLINE TRUCK

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FOURTEEN PASSENGER GASOLINE HOTEL BUS

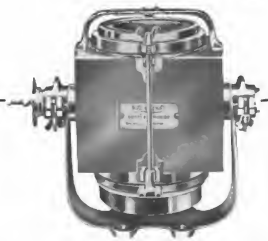
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Everything needing attention is in full view of the driver

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in the normal direction, will tend to return backward, including the crank itself; but this backward motion does not continue to transmit itself to the crank, properly so called, and, consequently, to the hand of the operator. In fact, the free wheel, revolving only in the normal direction, as we have remarked above, becomes suddenly immovable at the moment of the return. By this fact, the toothed sector of the click, acting like a satellite around the

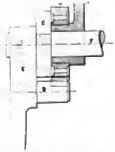


FIG. 3.—SECTION OF THE CRANK.—A.—ORDINARY CRANK SUPPORT UNDER THE CHASSIS. B.—FREE WHEEL. C.—CROCHET DISK. D.—CLICK EXCRANK. F.—END OF SHAFT

toothed external part of the free wheel, begins to pivot upon its own axis and forces the extremity, *D*, of the click to disengage itself from one of the notches, *C*, of the disk.

The crank then becomes independent of its shaft, F, and even in case the motor should continue its rotary motion backward, there would be no danger of the extremity, *D*, of

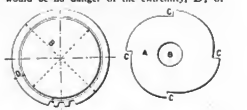


FIG. 4.—B. FREE WHEEL. F. TOOTHED SECTOR SERVING TO FREE OR TO DISENGAGE THE DISK. A. DISK, AND CCCC ITS NOTCHES. B. SHAFT HOLE

the click engaging one of the notches of the disk anew.

In fact, we remark that in the construction of the apparatus the periphery of the free wheel has been provided with but three teeth, forming the minimum meshing of the sector of the click with the wheel.

A New Anti-Skid Tire

A NEW anti-skidding tire has come into the field, for which the Continental Caoutchouc Company promises great things. This, the latest production of this German house, is a steel studded tire, and is constructed entirely without leather. Heretofore, all studded anti-skidding tires have had leather somewhere in their construction, having either a leather cover or a strip of leather set into the tread, into which the studs are fastened. Working on the hypothesis that, as the Continental Caoutchouc Company claim, no satisfactory union of rubber and leather can be made, and also in the belief that leather heats and melts the rubber when used in this manner in very fast or heavy work, the makers have produced this new tire.

It is a heavy tire, specially constructed with heavy walls and tread, over which is built an extra-heavy tread, with many layers of the strongest Egyptian cotton canvas, which protects the carcass of the cover, and the inner tube from the steel studs that are firmly held in place by being vulcanized into the mass of material of which this tire tread is constructed. These tires are made extra heavy and strong on the principle which seems to be gaining headway among motorists that half the tire trouble that exists is due to greater strain being put upon the tires than that for which they were originally intended.

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Paris Office: 11 Rue D'Alger.

Butler Motor Car Co., 998 Boylston St., Boston, Mass.

"MoToR Stands at the Head of the List"

Dear Sirs: Cleveland, Ohio, Sept. 11, 1905.

We are pleased to inform you that the result of our first Ad. in MoToR has been more than satisfactory to our company.

We have received replies from some of the largest and best-known concerns in the business.

The results obtained only go to prove to our satisfaction the large and well distributed circulation, which this magazine must have—and which you claimed for it.

We are fully convinced that as an advertising medium for manufacturers of automobile parts and accessories—MoToR stands at the head of the list. Yours very truly.

(Signed) **THE HATCHER AUTO PARTS CO.**
Per A. Hatcher.

AN EARLY MOTOR CAR

IN 1891, M. Levassor, of the firm of Panhard & Levassor, manufacturers of woodworking machinery had finally succeeded in putting a horseless carriage on wheels, and in making it run. The illustration represents one of the first, if not the first, of the motor carriages which made their exit from the celebrated establishment of Avenue d'Ivry.

The motor was a Daimler, ignited by incandescence, and of one and one-half horse-power. It was operated with a hydrocarbon, of a density of about 680 degrees, which was called "gasoline," probably to indicate to future purchasers (if there were to be any) that it was not a question here of ordinary mineral oil.

"I was one of the first to visit Avenue d'Ivry," says M. Baudry de Saunier in *La Vie Automobile*, "where I found M. Levassor, who explained the mechanism of the carriage to me and allowed me to try it in the empty courtyard of the works. He explained to me that it was possible to obtain three speeds of three, seven and ten and one-half miles an hour by the use of the curved lever, placed near the dashboard, but he repeated several times that he would never advise a customer to put on the third speed, because he considered it thoroughly dangerous. He told me, moreover, that on the preceding Sunday he had run into a hedge in the vicinity of Robinson, and had at once learned wisdom.

"But it is not with a personal anecdote that I wish to entertain my readers at present. I desire to place before their eyes a carriage es-



ONE OF THE FIRST CARS THAT PANHARD & LEVASSOR EVER BUILT

timate of the period, in the form of a letter addressed by Belvalette Brothers to MM. Panhard and Levassor. It is as follows:

"Gentlemen: As a result of our visit of 23d instant we have the honor to inform you that we can construct a carriage frame to accommodate four persons conformable to the drawing that you send us, without exceeding the weight of sixty-six pounds for the wooden part. As far as we can judge before constructing it, the body would cost (inclusive of iron work and seats) about 180 francs; four iron-shod wheels, 150 francs; trimmings, 100 francs. As for the painting, it would be necessary to know whether it included all or a part of the carriage.

"The price of lamps, axles and springs to be determined. For the protection of the carriage of which M. Panhard spoke to us, the most advantageous thing would be a canopy with four uprights. It would weigh fifty-six pounds." * * *

"A sixty-six-pound body and a pitiful 500 or 600 francs for the carriage builder! At present the exigencies of comfort have increased tenfold, as have also the weight and cost. A 660-pound body and a bill of 6,000 francs with the carriage builder are not rare."

Under a spreading motor-car
The village Smithy lays.
The Smith, a foxy man is he:
He's struck a job that pays.
No horse he shoes, for o'er his door,
The sign "Garage" displays.

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National

Reliability and Endurance

Were demonstrated in a convincing way on Nov. 16-17th at Indianapolis when a National Stripped Stock Car made

1094 3-16 Miles in 24 Hours

Breaking the World's Record by 78 9-16 Miles



Model **D**, 4 Cylinder, 35-40 H. P.
$3,000.

Watch for the
ROUND RADIATOR
at the
New York Show
69th Reg. Armory
Jan. 13th-20th, 1906



Model **E**, 6 Cylinder, 50-60 H. P.
$4,000.

WRITE US AT ONCE FOR FULL DETAILS

DISTRIBUTORS: Linscott Motor Co., 163 Columbus Ave., Boston
Ralph Temple Auto Co., 318 Michigan Ave., Chicago
Liberty Auto Company, 138 Beatty St., Pittsburg, Pa.
Homan & Schulz Co., 46th St. and Broadway, New York
Tioga Auto Co., Broad and Tioga Sts., Philadelphia, Pa.
National Motor Car Agency, Los Angeles, Cal.

NATIONAL MOTOR VEHICLE CO.
1004 EAST 22nd STREET **INDIANAPOLIS, IND.**
(Member American Motor Car Manufacturers' Association, Chicago)

BRISCOE SHEET METAL PARTS



We are in the midst of our most prosperous season and are proud of the popularity of our product as evidenced by its general adoption.

Briscoe construction has won out through its merits both of design and construction. Both of our plants are busy with orders from the most representative car builders. We have shown our ability to provide the best results for those wishing either tubular or honeycomb radiators. We have also enlarged our line of products to embrace all the sheet metal parts required on both water and air cooled automobiles.

Our exhibits at all the shows will be well worth visiting by automobile manufacturers and assemblers. We will have on exhibition the latest designs in which we have made up our several styles of trustworthy radiators as well as samples of new methods of water circulation developed by us in our experimental department. We may be found at the Garden in Section 74, Elevated Platform; at the Armory in Section 15, Gallery; at the Coliseum in Section 134, and at the Detroit Armory in Section 97, Gallery.



Our two plants bring BRISCOE PARTS within reach of all automobile builders and our workmanship remains—*the very best*



We are makers of

Both Honeycomb and Tubular RADIATORS
Iron and Aluminum HOODS and FENDERS
Sheet metal DECK BOXES, SEATS and MUFFLERS
Ornamental HOOD FRONTS for air cooled cars
Galvanized Iron and copper Gasoline and WATER TANKS
Plain and ball bearing DISC FANS
Concave Sheet Metal Dashes



Write to our nearest office for estimates

BRISCOE MFG CO.

Eastern Branch Factory: NEWARK, N. J. **Main Office and Factory: DETROIT, MICH.**

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Everything for Automobile Dealers and Owners

We are Manufacturers' Agents and Distributors, Manufacturers, Importers, Jobbers and Wholesalers of

Automobile Supplies, Materials, Accessories
AND TOOLS

Western Distributors of

CONTINENTAL TIRES

Best by Every Test

We Give Your Orders Careful and Accurate Shipment, Prices that are Right, Prompt and Courteous Attention

Send for "A Show in Itself"

Excelsior Supply Co.
Established 1876
233-235-237 Randolph St. Chicago, Ill.

A POSITIVE PREVENTIVE
Against skidding for Automobiles and Commercial Trucks. Is efficient in mud, Mud, Snow and Ice.



Our Chain Repair Tool is the Best on the Market

J. C. BROWN M'F'G CO.
BUTLER, IND.

For valuable information on Jump Spark Ignition

ADDRESS

C. L. ALTEMUS & CO.
The Bourse
Philadelphia, Pa.

Member National Assn. Eng. & Boat Manufacturers

Central Automobile Co.
AGENT FOR
CORBIN CARS
AIR-COOLED
4 West 38th St., New York City. Tel. 5114 38th St

FORCE FEED LUBRICATION



Constant Sight Feed No Liquids

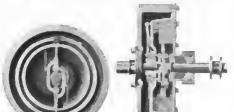
McCORD & CO., 1406-80 Old Colony Building CHICAGO
E. J. Dey & Co., Pacific Coast Distributers
324-326 Golden Gate Avenue, San Francisco, Cal.

THE RESUME OF THE YEAR

(*Continued from page 65.*)

reigns supreme, so far as actual numbers go. These attempts at the creation of something equally efficient as the older forms without their many disadvantages have taken different starting points from which to begin, though electricity and hydraulic power mark the greatest departures in this respect. Several types of the latter have been evolved, but entirely apart from any inherent shortcomings in the design itself their success must depend not upon this but upon the ability to maintain a sufficient supply of current for their working, and this has been found so difficult in the case of the ignition that few look upon this form with any favor. As for hydraulic power, there is apparently no good reason why, with proper designing and execution, an efficient clutch that would be an improvement over many present types should not be evolved. So far as actual progress away from the pioneer type mentioned above is in question, this must be conceded to the multiple disc form which has been adopted by a number of makers on both sides of the Atlantic, and its success on both light and heavy cars has been such that further recognition of its good qualities seems inevitable, despite the fact of its considerably higher first cost. Similar advances have been made in the adoption of other types of metal-to-metal clutches, thus eliminating the annoyance of worn leathers and frequent replacements, and what is true of the multiple disc is also true of these other types—they have, in the main, proven their claim to recognition, and the example of their builders will, no doubt, be followed.

While not strictly speaking a clutch, as it combines the functions of both this and the transmission, attention is due to the planetary or epicyclic gear in one case with three speeds forward instead of the usual two, and in combustion with a clutch, as on the Cadillac, which has, in the past year, been used on heavier



SPARKS-BOOTHBY HYDRAULIC CLUTCH

cars than was formerly thought advisable, and experience with it during that period has shown that it is well adapted to the purpose, while, in many respects, it must be conceded to possess advantages over other familiar types. A feature, for which this has been responsible, and which is the more noticeable, owing to its mechanical qualities, is the placing of the flywheel at the forward end of the motor with a three-point suspension. The design of the flywheel itself has undergone somewhat of a change in being given an increased diameter with fan-blade spokes to increase radiation—an expedient that bids fair to become a more or less standard feature of construction. While on this subject, it will probably not be a diversion to get back to the motor and the innovations that have been made in its fastening to the frame. With but one or two exceptions embodying rather daring conceptions in the shape of a three-point suspension, as exemplified by the cleverly worked out Duryea, Stevens-Duryea and Marmon, there has been little deviation from previously accepted standards on record.

Change Speed Devices

Despite all attempts to improve it out of existence, the sliding pinion still reigns supreme, and, where numbers are concerned, will be found to be far in the lead with no second in sight, so that it would appear, on the face of it, that few, if any, of the endless experiments made along this line have resulted in the pro-

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FISK TIRES



SAVE TIME, MONEY AND TEMPER

WITHOUT Fisk Tires you are simply wasting Time, Money, Temper,—and Comfort. They are the only tires constructed on Strictly Scientific and Practical Principles.

Positive Locking Device, insuring SAFETY
All Air Above the Rim, affording COMFORT
Superiority of Quality, guaranteeing DURABILITY

Our production for '06 is the finest that we have ever offered, representing, not merely high-grade exterior evidences, but Honest Quality—"Fisk Quality" that is at present unsurpassed.

Truly, 'twill be Worth Your While To Buy Fisk Tires.

We should like to send you a little printed article on tires

THE FISK RUBBER CO.,
Chicopee Falls, Mass.

We believe that a very large portion of the tire-trouble suffered by motorists is due to their ignorance in regard to the care and proper manipulation necessary for the preservation of motor-tires.

We also believe that, with the proper encouragement and instruction from the manufacturer, the driver of a car can materially reduce his tire-expense which is now so large an item in the cost of operation.

We have, therefore, decided to offer cash prizes to the amount of

$1000.00

for a *TIRE ECONOMY COMPETITION* to continue throughout the year 1906.

Every owner or driver of a motor-car is eligible to enter this contest.

The prizes will be awarded according to the tire-expense per running mile. Contestants may enter at any time during the year, but must complete 2500 miles before the close of the competition.

We will forward particulars of this competition and instructions for the care of tires on request.

PENNSYLVANIA RUBBER CO.,
JEANNETTE, PA.

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The
Witherbee
Storage Battery
Igniter



Recognized as the most satisfactory means of ignition

Every Battery guaranteed to give satisfaction or purchase money refunded

Avoid Ignition Troubles by Having Your 1906 Car Equipped With a WITHERBEE

Our Batteries are used and endorsed by forty-five of the leading Automobile and Motor Boat Manufacturers

WRITE FOR DESCRIPTIVE PAMPHLET

Witherbee Igniter Co.
541 West 43rd Street
New York, N. Y.

Motor Messengers Bring Results

One advertiser who used the classified pages of Motor Bureau, in the December issue, has received up to date (December 15th) 173 answers from 35 states and territories. These prove conclusively that a Motor Messenger, announcing a second-hand car for sale at a reasonable price, will bring the desired results. Answers for this same advertiser are still coming, (December 15) and the total number of replies will probably reach 200. Look at the pages of Motor Bureau in this issue—then send in your advertisement.

duction of a commercial success. Probably this is true. At any rate, none has reached a stage where the manufacturer has felt justified in adopting it. Electricity in the form of magnetism has also been tried in this field, but it is, naturally, open to the objection already mentioned. A choice of transmissions would seemingly be confined to either a sliding gear or the planetary type according to the weight and power of the car, and as adverted upon previously the latter has been encroaching upon the domains of its higher-powered rival. Then, further, there are sliding gears and sliding gears, and the type so largely used in the past year would hardly be recognized as the descendant of its ancestors of a few years back, so that it would not be entirely true to state that no improvement in this respect had been brought about in the past twelvemonth. Of all the wonderful gear combinations brought forward by inventors at the last show, one of which, at least, excited considerable attention and favorable comment, nothing has come to light. Doubtless, as long as there is a show in which to exhibit them, aggregations of this kind will not be found wanting, though it is curious to note that but few survive and new recruits are added each year.

Transmission

Coming to the transmission proper, it is not difficult to note the gradual but very general tendency prevalent where this part of the car is concerned, and the experience of the past year has done much to develop it. This is the change from the chain in some instances to the propeller shaft drive. There is much to



ELECTRO MAGNETIC CLUTCH (IN SECTION)

be said for the latter, and little against this form where the light car is concerned, but difficulties increase with the weight, although some of the heaviest cars placed on the market in the past year were so equipped. Practice demonstrated conclusively by the use of a large number of cars that much of the theoretical disadvantages of the live axle disappeared when put to the test. One of the results of the more general use of the cardan shaft has been a change in the location of the change-speed gear box, as well as the differential, both these now being centered at the point of intersection of the bevel drive with the rear axle, and in one or two instances the combination has brought forth an extremely bulky and heavy-appearing case just at this point, materially decreasing the road clearance, which is a decided disadvantage on American highways. The majority of high-powered cars, especially the racers, have remained firm to the chain, but it would not be at all surprising to see a further increase in the ranks of the adherents of the cardan shaft during the coming year.

The shaft, which is the essential feature of the latter form, has been brought to a state of efficiency which does not leave a great deal to be desired. Some builders have thought it necessary to use two universal joints and a sliding or compensating coupling, while others have designed the arrangement of the motive power with a view to eliminating as much angular friction as possible. In either case, it is not too much to say that from the experience obtained with this form of drive on thousands of cars in the past year, it has firmly established itself, and that sooner or later builders of higher-powered cars will find it possible to overcome the present disadvantage attendant

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ATWOOD Manufacturing Co.

Amesbury Mass.



Parabolens Gas Headlight No. 33





Gas Headlight No. 12
Three-quarter View

Some of Our Productions for 1906

Rich and Exclusive Designs

See our Exhibit Madison Square Garden, Space 91

Design Patent applied for

Our Lamps appeal to critical people who want goods that are *strictly high-grade.* In the ATWOOD MANUFACTURING CO. lamps you have an absolute guarantee of the *best,* backed by 30 years' successful Lamp making.

This Auto Tire is both Durable and Lively

When you buy an *ordinary* Auto Tire, you have to decide a difficult question.

Is it best to get a hard, inflexible tire, which will rack your bones and soon put your car out of business, but which will *last a season or more*

Or—

To get a soft, resilient, easy riding tire, which will go to pieces in a short time because it won't stand the wear and tear of the road?

Momentous question.

And either way you answer it—you lose.

Because if you decide on the *hard* tire, it means breakdowns on the road, and consequent liberal use of a farmer's team. It means constant repairs to your engine, a car always in the shop. Your aching joints are thrown in for good measure.

And if you select the *soft* tire, it means punctures, tire explosions and tire troubles generally. And you have to buy new tires every little while.

It's Money—Money—Money, either way.

You'll envy Rockefeller before you get through.

Now you can *dodge* this momentous question if you will.

Because the Goodyear Detachable Auto Tire has all the GOOD points of both the *hard* and the *soft* tire with the bad features of neither.

It's easy for anyone to understand WHY this is true. Read carefully, and see for yourself.



First, look at the section of the Goodyear Tire in the center column. Notice the crescent shaped portion in solid black where the wear of the road comes. That's dense, firm rubber, as tough as rawhide—practically no wear out to it. It's what the *hard* tire is made from.

Now right underneath this is the remainder of the outer tube (shown in grey) which is made from pure para rubber, as resilient and springy as it is possible for rubber to be. It's the same as the seldom-used *soft* tire.

These two different kinds of rubber—the dense, tough composition, to take the wear, and the soft, elastic rubber, to make you ride easy—are made into one solid piece by a special process. You can't skin the two kinds of rubber apart with a knife. Try it if you doubt.

The dense rubber and the soft rubber together make a tire that's almost as durable as a *solid* tire, a tire difficult to puncture yet one which is as *resilient* as a man could reasonably ask.

Our "Good News Book" tells more about the good points of this trouble-saving tire. You ought to get it now, for the Goodyear Detachable Auto Tire with Universal Rim will be "the only tire" next season.

THE GOODYEAR TIRE & RUBBER CO., Mechanic Street, Akron, Ohio

Branches in following cities: Boston, 6 Merrimac St.; New York, 253 W. 47th st.; Chicago, 139 Lake St.; Cincinnati, 207 E. Fifth St.; St. Louis, 722 Th Morgan St.; Cleveland, 80 Frankfort St.; Philadelphia, 1811 Spring St.; San Francisco, Geo. P. Moore & Co., 506 Golden Gate Ave.; Buffalo, 739 Main St.; Denver, 220 Sixteenth St.; Detroit, 262 Jefferson Ave.

We furnish ALL SIZES of Tires with BAILEY TREADS, if desired

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WOODS

Builders of Best Quality Electric and Gasolene Automobiles



Stanhope

More than *600* Woods Electric Autos in constant use in the City of Chicago



Chain Victoria With Leather Tops for Summer Use

A Few More Good Agencies Open



Chain Victoria With Brougham Top for Winter Use

There Tops Are Interchangeable

The past twelve months have demonstrated the Superiority of our 40 H. P., Gasolene Car

Write for Catalogue and Information



Extension Brougham

See Our Exhibit at Coliseum Chicago

WOODS MOTOR VEHICLE COMPANY
CHICAGO, ILL.



Auto Screw Jack

Powerful Ratchet Double-Acting Screw Jack
Easy to Operate Quickly Adjusted

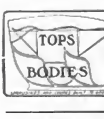
No.	Weight Each	Lifting Capacity	Adjustment
501	6 lbs.	3,000 lbs.	11 to 17 in
502	8 lbs.	4,000 lbs.	13½ to 19 in
503	12 lbs.	6,000 lbs.	14¾ to 23¾ in.

COVERT MFG. CO., - - Troy, N. Y.

TOPS BODIES

LATEST STYLES & PRICES ON APPLICATION

DETROIT MOTOR CAR SUPPLY CO.
DETROIT, MICH.



A COOLER THAT COOLS

Investigate this. It is positively the best cooler on the market to-day. Does wonderful work. Great strength and durability. Won't clog up. Won't leak. If damaged by accident, broken tubes can easily be replaced. Write us.

FEDDERS MFG. WORKS, Buffalo, N. Y.

THE SOLVAY PROCESS COMPANY'S "KAL-KRYSTAL"

MAKES THE BEST NON-FREEZING SOLUTION FOR AUTOMOBILE USE

Neutral and non-corrosive. Stands 30 degrees below zero. Take Put up in 10-pound cans. Makes 5 gallons of solution ready for use. For sale by all automobile supply Houses.

CARBONDALE CHEMICAL CO., Carbondale, Pa.

NO MORE BLOW-OUTS

If You Use The TIRE SAFETY VALVE



Actual size.

Send to day for descriptive circular and prices. Liberal discount to dealers.

Eastern Auto Appliance Company
Journal Bldg., Boston



Asbestos Filled Copper Gaskets

Absolutely guaranteed to give satisfaction. Any size or shape to order. Sheet Metal Work. Carbureter Floats, Clock, Ammeter and Odometer Cases.

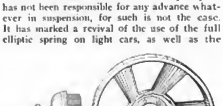
GOODWIN & KINTZ CO.
Winsted, Conn.

upon placing a very heavy chassis on a live rear axle.

Springs

Unfortunately, this is a feature in which little development has taken place during the past twelvemonth, although, to judge from the amount of attention devoted to it by technical writers, and also by designers of cars, there should be something of value to record in next year's models. Right from the beginning the average suspension has been inadequate for the task imposed upon it. Manufacturers of springs have followed the formulas employed in calculating the requirements of carriages and heavy trucks, and it is needless to add that what is successful in such capacities, or anything figured upon the basis of experience gained in such work, can fulfill the needs of the car. It not only weights more than the usual heavy draught truck, but travels immeasurably faster; the same applies to the carriage, from which, in fact, motor-car springs practically have been borrowed. General faultiness of this part of a great many cars has provided an opportunity for makers of accessories and others to market auxiliary spring devices, the necessity for which is well illustrated by their success.

It must not be understood that the past year has not been responsible for any advance whatever in suspension, for such is not the case. It has marked a revival of the use of the full elliptic spring on light cars, as well as the



PANHARD MULTIPLE DISK CLUTCH

adoption, in some instances, of a transverse or platform suspension in the rear; also the creation of a sort of compensating system in which the rear and forward springs are coupled by a third extending along the side of the body and opposed to them. A Michigan inventor, with a number of patents dealing with compressed-air machinery to his credit, has conceived the idea of suspending the car upon four compressed-air plungers fed from an accumulator tank at the will of the operator, so that the stiffness of the suspension may be readily varied in accordance with the load. One of the novelties is the use of C springs at the rear, coupled to transverse springs as on the *C. G. V.*

Tires

It is a natural step from springs to tires, for the latter have, in reality, been doing a large percentage of the duty really intended to be borne by the springs, which, if properly designed and applied, the latter would carry. Concerning tires themselves, the question as to whether they have undergone any radical improvement in the past year is one to be avoided rather than answered. It might be answered both ways with equal truth. Barrels of ink and reams of paper have been used in chronicling the efficiency and the shortcomings of these air-shod feet of a car and in telling just how to construct the perfect pneumatic tire, but neither all these, nor ninety-five per cent. of the hundred of patents issued during the same time, have had any appreciable effect in solving the problem. Apart from the Samson and the new form of tire placed on the market by Michelin, after many months' experimenting, there is little of definite moment to record; that is, with particular reference to any marked improvement that has been brought about in the construction of the tire itself. There has, however, been one development of considerable import to both user and maker of tires, and that is a frank recognition of their shortcomings on both sides. The fact that many manufacturers

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Keep it new and bright with the new cleanser

MOBO

Elbow grease and common soap will not preserve the polish of an automobile. It may remove the dirt—but the shine goes too. Mobo is unlike any other substance for cleaning automobiles, preserving and restoring the original lustre; removing grease and travel stains. Mobo is a preserver—it prevents blistering and cracking of the painted surface. Absolutely harmless to the hands. Can be used on the leather work of the automobile (also harness) as well as the wood and metal work.

Put up in 2 lb. and 8 lb. cans; also in tubs, half barrels and barrels. If your dealer hasn't it—tell us, we will see that you do get it.

JOHN T. STANLEY
644 W. 30th St. NEW YORK

A Preposition Proposition

THOUSANDS of Automobilists who used to swear AT Tallow Greases, now swear BY

NON-FLUID OILS

This is because, unlike Greases, Non-Fluid Oils do not feed too fast in hot weather, nor too slowly in cold weather. Neither do they leave a gummy residue between bearing surfaces to decrease the mechanical efficiency of the engine.

If You Are Skeptical, Ask Us for a Free Sample

New York & New Jersey Lubricant Co.
14 & 16 CHURCH STREET, NEW YORK
Branch: 79 Ninth Street, San Francisco



Avalon Storm Aprons

afford complete protection against storms and bad weather for both cars and occupants. Made with openings for one to five persons. Fasten closely about neck. Openings can be closed if not used. Heavy rubber cloth—plaid back.



WE ALSO HANDLE

Weed Chain Tire Grips

Prevent Skidding and Assist in Traction on Muddy Roads

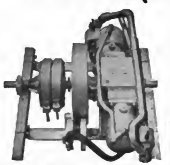
Write for "Special Deal" prices on above

The Ball-Fintze Co.

Dept. A, NEWARK, OHIO

BRENNAN STANDARD

20 and 30 H. P.
For
Commercial Cars



Standard Horizontal Motor, Mounted With Planetary Gear also Sliding Gear

Sizes, 6 to 30 H. P., two Cylinder, 20 to 80 H. P., four Cylinder

TESTIMONIAL.

STRATFORD, PA., 10-19-'05.

BRENNAN MOTOR CO.,
Syracuse, N. Y.

GENTLEMEN:—It may be of interest to you to know how your motor has been working, and how I am pleased with it.

So far I have not been able to find a hill steep enough to make the engine labor. For hill climbing, and general flexibility, no automobile I have ever seen (regardless of power), is in it at all. It has been the source of a great deal of pleasure to me to go scampering up hills, on the high gear, past other machines.

Thanking you for your past attention, I am,
Yours truly,
Name given on application.

We make special Motors and Transmission Gears for Oldsmobiles, Northern Runabout, Old. Touring Cars, Cadillac, Ford, Thomas Model 17 and 18, General, Yale, Autocar, White steam cars, Glide, Rambler, Cleveland, Grout, Pope-Hartford, Sandusky Runabout, St. Louis Runabout, Marr, and all standard makes of cars. Special motor and transmission for commercial cars.

BRENNAN MOTOR CO.

SYRACUSE, N. Y.

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STA-RITE
SURETY



Messrs. Clemens & Mera were sure of the four No. 4 Sta-Rite Plugs when fired 850,000 charges in 24 hours—distance 1004 miles. You can always be just as sure of any of the 47 sizes of improved "Sta-Rites" this typical. Insist upon having "Sta-Rites" in your new car and save bother.

Garden Show Space No. 78.
Armory Show Space No. 61.
Coliseum Show Space No. 1178.

The R. E. HARDY CO.
225 West Broadway, New York City

No. 30, 31 in. Rim, $7.50

HIGHEST QUALITY COMES ONLY FROM SPECIALISTS
We are Gasoline Motor Specialists



We excel because we make a specialty of one thing, and devote all of our time, energy, etc., to this one product, and as a consequence our motors are lighter, more powerful, more durable, more reliable and quieter than others. Watch our 1906 product.

Are You Interested?

If so our catalogue will enlighten you, and is yours for the asking.

THE KIRKHAM MOTOR MFG. CO., - BATH, N. Y.



"Multum in Parvo" Auto Kit
Formerly 137 to 141 Nassau St.
John Boyle & Co.
Manufacturers of
Leather Hampers
and Automobile Robe
License Numbers:
113-114 Duane St.
70-72 Reade St.
NEW YORK

LET US ACT
AS YOUR FACTORY
That is our business. We make anything mechanical in any metal. Particulars mailed on request.
KALAMAZOO NOVELTY WORKS
112 ROSE STREET KALAMAZOO, MICH.



Artillery Wood Wheels
MADE FROM ANY DESIGN
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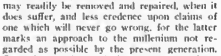
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"U. S." JACK
THE NEW HEAD lifts the truss brace—square or round axle. Side motion to lever. Compact, strong, doesn't rattle, cannot drop. No. 1 10½ inches high; weighs 5½ lbs
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have greatly overloaded the tires placed on their cars, that the weight of the latter was totally disproportionate to the size of tire supplied, was a matter of common knowledge before 1905, but the purchaser was helpless, and the reputation of the tiremaker suffered in consequence. It was not to be wondered at that a three-inch tire should go to pieces in a comparatively short period, when subjected to the load intended for a tire an inch larger, but the tire manufacturer was blamed for the sin of penurious economy. The convention of builders and tire manufacturers held several months ago, and the schedule of tire sizes and weights agreed upon, must, in consequence be accorded the importance they deserve. The motorist, in general, has, moreover, come to recognize that comfort and speed are only attainable at the expense of worn rubber and an occasional puncture, so that in place of bewailing the perishability of the pneumatic, and chasing the will-o'-the-wisp of the perfect substitute, the majority are now content to use it with the consideration due its weakness or pay the penalty in repairs and replacements. There is, accordingly, a premium placed on the tire that may readily be removed and repaired, when it does suffer, and less credence upon claims of one which will never go wrong, for the latter marks an approach to the millenium not regarded as possible by the present generation. Spare inner tubes and shoes are now universally conceded to be by far the best roadside



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repair, and attempts have been numerous in the past year to increase the facility with which the latter may be substituted for the damaged ones. An outcome of this has been the invention of several forms permitting an inflated to be put in place of the one taken off, by means of a removable rim upon which the spare one is mounted.

Body Design

This has, of course, followed the general trend of improvement noticeable in everything concerning the car, but it is further to be noted that the carriage body-maker has at last come to a full realization of his opportunities, with the result that is everywhere evident in the shape of luxurious bodies of the closed type that mark an advance over anything hitherto reached in the art. This, of course, has been made possible by the adoption of the extremely long wheel base. It will be recalled, as the opening of the season of 1905, how numerous and dire were the predictions anent the disasters that would follow from placing such heavy motors and bodies on what then appeared to be extremely long frames. The wheel base limit of safety had not alone been reached, but, in many cases, much exceeded, according to these reports. All this has not alone disappeared, but, as a mark of the confidence entertained by makers in their designs and materials, there will be further, though slight, increases in next year's cars, as witness some of the 1906 models placed on the market already. In this particular the greatest development

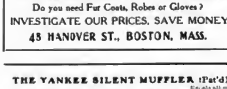


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Exhausts all smoke and flame. The gases expand according to the size of the explosion. A vacuum is created between the inner and outer shells, which draws the burnt gases from the cylinder, and prevents backfiring. Radiation so great that the muffler keeps cool also engine. Fits all makes of cars. Send for circular and price. D. E. Smith & Co., Utica, N. Y., U. S. A.



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Most Practical of Automobile Signals. Is blown from exhaust, giving a rich, musical chime. Price $15.00, including one hornet.
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Our 1906 Coil is a revelation, the most rapid, economical, reliable and durable coil made in the world (not excepting any). You cannot puncture or rupture it, as the insulation is so perfect that it is proof against these troubles.

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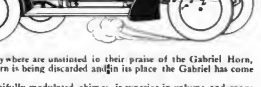
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Can be heard distinctly above the loudest din for a mile or more. It is extremely penetrating, but never discordant, and warns without frightening.



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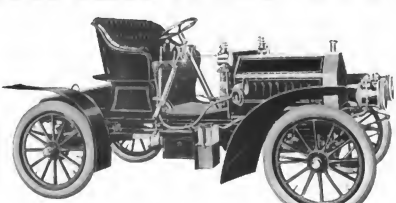
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Weight	1300 lbs.	Ignition	Napier's famous synchronized system, using single coil and storage batteries.
Wheel Base, 90" Wheel Gauge, 52"		Oiling	Positive mechanical oiler; capacity, 2 gals.
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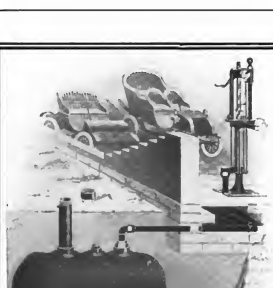
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brought about during the year has been the universal adoption of the closed body of one type or another, making the car an all-year-round vehicle, a notable departure being the importation of low-powered chasses of say from 8 to 20 m.p. to be fitted with closed bodies for town use.

Forecast of the Next Twelvemonth

It may not appear profitable to undertake rashly to predict just what 1906 will bring forth in the way of change and improvement, but this impression must fade upon closer consideration of the subject. Coming events cast their shadows before, and both 1904 and 1905 have paved the way for what is to come in 1906 and succeeding years, in a manner that renders it more or less easy generally to outline more or less closely what will be the trend of improvement for at least one season in advance. Matters have gradually assumed a condition where radical or revolutionary changes are not merely highly improbable but next to impossible, if for none other than the simple reason that there is now too much at stake. Prior to 1904 each maker and each car were a law unto themselves, like the motors which some of them adopted as a basis for their power plant, the acceptance of new features was oftener than not governed on the "hit and miss" plan.

Many were then newcomers in the field and those who had preceded them by a few years were not vastly better off. Their models succeeded one another more in the form of complete and isolated experiments than as progressive steps in the process of evolution to practicable serviceability that has since taken place. It is hardly necessary to state that the industry, as a whole, is now well past that primal period of experimentation where the lead of one prominent maker would be sufficient to draw after him most of the others. Not that experiments are not going forward constantly in the testing-out shops of all the larger builders, but a plane has been reached where even the most daring innovation that, on its face, promised to revolutionize matters must prove itself before exciting more than passing comment or mild curiosity on the part of those most vitally interested. It is, accordingly, not difficult to sketch the developments that may reasonably be expected during the coming year.

But besides this there will be an assortment of cars of varying types and powers to be had this year at figures well within the reach of many who have, up to the present, deemed the motor-car a luxury far beyond their means. From one hundred to several hundred dollars have been subtracted from last year's figures, despite the fact that improvements in material and design have, in the majority of cases, been added.

It is not to be anticipated for a moment that the passing of the coming season will be productive of revolutionary changes of any nature. Development will, in short, continue to be along the same conservative lines that have marked its advance during the year just past; the motor-car and its ally of the water—the motor-boat—will continue to improve little by little, and, as they have already reached a stage where change must be confined to detail, it is hardly probable that 1906 will see more, proportionately, of this than did 1905, but certainly vastly less than years preceding.

The single-cylinder motor is particularly adapted for use in the light runabout, a typical American product. The horizontal, double-opposed motor, which has reached its highest development here, will again prevail in medium-priced touring cars of medium power, such as no other country produces.

The two-cycle or two-stroke motor, as it is properly called abroad, has from the earliest period of cylinder-fired, gasoline motor construction been very justly popular among builders of launches and for stationary work. One Western maker of motor-cars has always made it successfully, both mechanically and commercially, and its recent adoption by one of the biggest of our Western makers would seem to indicate a following of this lead and its further adoption generally by motor-car makers. Its low cost, its simplicity, and its ready

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ROYAL TOURIST

POINTS. Runs quietly—Costs less for repairs than any motor car built anywhere—Steers easily—Perfect control of motor—Certainly is fast—Is built with care.



We have a full description of 1906 model ready to mail to you if you will send us your address. Will also mail booklet explaining performance of '06 model in Vanderbilt Trial Race.

The Royal Motor Car Co.
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AGENTS: C. A. Duerr & Co., New York, N. Y.; G. J. Dunham, Boston, Mass.; The McDuffee Automobile Co., Chicago, Ill.; G. W. Caslis, Minneapolis, Minn.; Automobile Supply Co., Lim., Toronto; Motor Shop, Philadelphia, Pa.; Westminster Automobile Co., St. Louis, Mo.; Standard Automobile Co., Pittsburg, Pa.; Amos Pierce & Co. Syracuse, N. Y.; Thompson Shoefhl Co., Rochester, N. Y.
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The Simplest Gasoline Car in the World

Both as to Construction and Control and the easiest to operate and maintain. Not only eliminates many objectionable features common in automobile engineering, but possesses points of excellence not found on any other car.

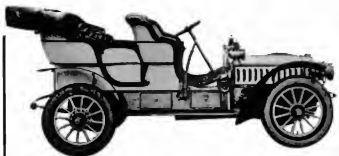
Positively self-starting from the seat every time
No cranking under any circumstances.

40-45 Horse Power with Quinby Aluminum Tonneau $5,000
Limousine or Special Bodies to Order.

"Marks a New Era in Automobile Construction"

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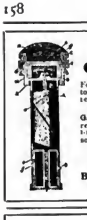
60 H. P. AUSTIN 1906 Model



Exclusive AUSTIN features: New complete double ignition system, improved (patented) sliding gear transmission (selective type), four forward speeds with new (patented) method of operation, new (patented) spring controller absorbing recoil. A beautiful and exceptionally well built car, strong in every part. Write for full particulars.

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For tanks with or without pressure, to show quantity of gasoline. Simple, reliable and of superior workmanship.

The "Triumph" Gasolene Tank Gage has been adopted as part of the regular equipment of all "Pierce Great Arrow" Cars for the season of 1906.

See that your new car has a
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THE WEEBER MUFFLER

is being used by the largest and most prominent Automobile Manufacturers. It is up-to-date, durable and looks well. Will give full power of engine and have a pleasing tone to exhaust. Will guarantee absolute satisfaction or refund the money.

Special size Mufflers for Winton Autocar, Peerless, Olds, Franklin, Locomobile, Maxwell-Briscoe and many other well known cars

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SCHUG SPARK COILS
ARE RELIABLE
TRY THEM : : :
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Younger's Scotch Ale
after motoring or after driving, words-off a cold and clinches the benefit of your outing
"Be sure it's Younger's, though"
Imported in Stone Jugs since 1749



Eureka Auto Jack, No. 3.
Patented September 22, 1903.
This auto jack is a little wonder. Light in weight but strong in lifting power. Small in size, but will easily lift a heavy car, or
Weight four pounds, capacity 2,000 pounds.
Handle detachably connected.
Raises or lowers by using same handle.
To pump down it must be under a weight of at least twenty-five pounds.
Directions: To raise a weight, press down on the little steel lever and lock it out by pushing to the right or left. To pump down, release the little spring lever.
EUREKA MOWER CO.
UTICA, N. Y., U. S. A.
Mention "Motor."

adaptation to the fitting of a low-tension make-and-break spark, to say nothing of its nearly constant torque, almost rivaling in this respect the electric motor, should commend it to both motor-car makers and users generally.

The coming shows will reveal for the first time in this country—with the possible exception of the Napier six-cylinder chassis shown at the last show—the début of the six-cylinder motor and its bid for popularity. The London and Paris shows both revealed a number of them, and a few eight-cylinder motors. The six-cylinder motor, it must be borne in mind, is really a doubling up of the three-cylinder motor, its cranks being set at an angle of 120 degrees and not at 180, as in the four-cylinder type, which should at least produce a more constant torque and ease of control, but adding to cost and space.

The Advent of the Aero Club of America

PRACTICAL motor-ballooning in America has taken a new departure by the founding the Aero Club of America, at the instigation of no less a practical motorist than the founder of the Automobile Club of America, Homer W. Hedge. It is not surprising that his lead was at once followed by such other enthusiasts and sportsmen as A. R. Shattuck, D. H. Morris, George F. Chamberlain, John O'Rourke and a hundred other charter members, with the veteran S. M. Butler as secretary. The recent successful flight of fifteen balloons from Paris, in one afternoon, to various points eastward, in which some of them covered hundreds of miles, undoubtedly concentrated attention to the subject. Without question, the motor has projected ballooning into a new plane, and the many remarkable feats it has made possible are but forerunners of others more astonishing; for instance, it does not require much experience in the past history of mechanical ingenuity to foresee that the ratio of driving power to weight of the machine operating it, is on the way to some astonishing development. Already the almost incredible engine, which only a short time ago seemed to have reached the limit, in generating one motor-power for every seven pounds of its weight, has been outclassed by the construction of one which has developed one motor-power for every two and a half pounds of its weight. At that rate the motor-power necessary to overcome wind resistance, under conditions now thought impossible, will, in a very short time, be brought within the range of the practical. In the same way photographic studies of the flight of those birds who seldom move their wings during flight is revealing new lines of designing in the aeroplane. Lastly, the cost of experiments is every day being reduced by the avoidance of errors. The advent of America into the field is a distinct acknowledgment that the subject is emerging into the actual, rather than the theoretical.

Motor Driving in the Fog

AMERICANS have had little experience with fogs, at least as compared with their compeers across the ocean, yet occasionally a ground fog will give a good deal of trouble, especially at night, when they are most prevalent. It is a common error to think then that the more light the safer the driving of the motor-car during such fogs. It is not so. Motorists when driving through a fog should dim the intensity of their acetylene lamps by tying a handkerchief over them to prevent them from casting up a most confusing and disconcerting light.

Uncle Si: "That's one o' them there summer gals, I reckon."

Farmer Hi: "I guess it is."

Uncle Si: "Wa-al, I'd rather see one o' them go past than one o' them pesky autom'biles that smashes an' wrecks everything."

Farmer Hi: "Pussonly, I don't know much about 'em; but by what I've heerd tell on 'em, I reckon they if a man gets in the way one's dangerous as t'other."



"Champion Accumulators"
FOR IGNITION
The 6-volt, 20 ampere hour is a recognized standard.
In a 3-compartment rubber jar for auto work, 8" x 4" x 7" high. Price, $10.50.
In glass jars, wooden case, for marine use. Price, $7.50.
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MOTOR CARS
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"Slip On" Motor Coat
made of English gabardine cloth, rain proof and really indestructible. Its roominess and freedom of movement makes it the finest motor garment made.
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Designers of Sportsmen's Clothes
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Acme of Perfection
American made car of Foreign design.
FIVE MODELS
$800.00 to $2,750.00
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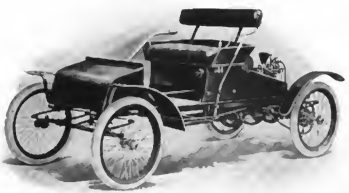
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For Testing Batteries
GUARANTEED
Sample, including leather case, prepaid on receipt of $8.00
3 Volts
20 Amperes
Send for Catalog.
The ROBERT INSTRUMENT CO.
68 SHELBY STREET, DETROIT, MICH.



The Mesinger Non-Skidding Tire Band
To be used on Wet Roads, Sand and Ice
Size Price Size Price
3½ $ 7.50 4½ $ 9.00
3½ 8.00 5 9.50
3½ 8.50 5½ 10.00
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Orient
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BUCKBOARD



A Remarkable Little Motor Car for $400.

Has maximum power ratio of 40 to 1 which is more than twice that of any Automobile made. Has no equal for hill climbing or through sand and mud. Has numerous forward speeds and *reverse*. Engine is mounted on the frame above elliptic springs and has a three-bladed fan attached to it. Makes no more noise or vibration than a 4-cylinder touring car. Has 10-inch clearance from the ground. Oiling is done from the seat by means of a hand pump. Has conventional shape of hood and back. Entire rear construction except motor is encased and dustproof. Active agents are desired for unassigned territory. Unequalled economy—35 miles to one gallon of gasolene and one-third pint of oil.

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The "Valveless Wonder" for Automobile Lubrication

WE offer to the automobile trade a mechanical lubricator without valves, stuffing boxes or springs. The only pump on the market which will pump against any pressure whatever. Manufactured in any number of feeds and readily adapted to any automobile on the market. No sight feeds are necessary, but where parties want them we are prepared to furnish them.

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MR. B. A. GRAMM'S

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The Logan—That Car of Quality

at the New York Automobile Show, 69th Regiment Armory, Section E, Basement

THIS IS OUR 1906 LINE

RUNABOUT,	10 H. P.	Air Cooled
LIGHT TOURING CAR,	20 H. P.	Water Cooled
LARGE TOURING CAR,	30 H. P.	Water Cooled
LIGHT DELIVERY CAR,	10 H. P.	Air Cooled
2-TON DELIVERY TRUCK,	30 H. P.	Water Cooled
20 PASSENGER BUS,	30 H. P.	Water Cooled

Every Feature of the 1906 Logan Cars is founded on experience.
Made of the best materials obtainable and every car is thoroughly tested before leaving the factory.

Write for Catalogue E-1 Giving Description and Prices

THE Logan CONSTRUCTION COMPANY
CHILLICOTHE, OHIO

No-Mor Auto-Freeze

lives right up to its name. Cold weather can't freeze the water in circulating systems where it is used. Already dissolved and one charge is enough for all winter.

Here is what a chemical examination brought out about it.

The General Laboratory Co., Chemists
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"We have examined and tested **No-Mor Auto-Freeze** and find that it will not corrode brass, aluminum, copper, galvanized iron or solder, and that it will remain fluid at 10 degrees below zero Fahrenheit. Another good feature of the product of this formula is that it will not crystallize out, hence no danger of clogging the circulating system."

75 cents a gallon at dealers, or f. o. b. Cleveland, Ohio.
Sold only in 5- and 10-gallon cans.

GOOD PROPOSITION FOR DEALERS

Every dealer should sell **No-Mor Auto-Freeze** and now is the time to do it.
Write for liberal terms and full particulars.

Owen Chemical Co.
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"CONTINENTAL"
AUTO LAMPS, CLOCKS
and
CALLIOPE HORNS

Importers of
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AMMETERS, &c.

United States Agents for
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"The World's Best"

The Motor Car Equipment Co.
Manufacturers, Importers, Distributors
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The Genuine "BLANCHARD" Sounds Like A Fog Horn
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Latest Designs

The New French "SIREN" Sounds Like A Lioness

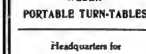




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SOUNDS LIKE AN ORGAN

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You may need it. Our case contains all the necessary remedies and bandages, etc., together with full instructions.
Send a dollar for it.
U.S. EMERGENCY CASE CO
Utica, N. Y.

BRYANT RIM FOR AUTOMOBILES
Tire removed in thirty seconds.
Replaced in same time.
Advertised in leading magazines.
Sales mainly made and every rim guaranteed.
Money refunded after 30 days if not satisfactory.
We want every dealer to become a BRYANT agent.
Ask about it.
THE BRYANT STEEL WHEEL AND RIM CO.
452 Hayden Bank Bldg. COLUMBUS, OHIO

Auto Protective League
Organized under the laws of the State of New York
It is the main object of the corporation to relieve owners of automobiles of all cares, inconveniences and difficulties in any way relating to, or in connection with, the use of automobiles. Write for particulars.
Main Office, 41 WEST 38th STREET, NEW YORK CITY
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7 Distinct Styles; 160 Sizes
Our Specialties: Expansion Joint Dry Pipes, Flat Head Insets. Guaranteed Repair Work.
Steam Carriage Boiler Co., Oswego, N. Y.

FOR BETTER LUBRICATION
DIXON'S GRAPHITE MOTOR LUBRICANTS
Interesting Booklet and Samples FREE
Joseph Dixon Crucible Co., Jersey City, N. J.

THE NEW YORK SHOWS

(*Continued from page 49*)

quently secured the Sixty-ninth Regiment Armory, in accordance with its regular plan of holding an exhibition each year, the National Association of Automobile Manufacturers withdrawing from the field.

Both of the shows, with equal truth, are claiming to be the "Sixth Annual Show." That in Madison Square Garden, while the first held directly under the auspices and patronage of the Association of Licensed Automobile Manufacturers, is really the sixth New York show held in Madison Square Garden. The show in the Sixty-ninth Regiment Armory, under the auspices and management of the Automobile Club of America, is the first show to be held in that new structure and is really the sixth annual motor-car show held in New York City, of which the Automobile Club of America was either the sole or a participating promoter.

As a matter of fact, the first motor-cars exhibited in a show in New York were in Madison Square Garden in 1900 at the last bicycle show ever held in this country, which was held under the then decadent National Association of Bicycle Manufacturers. The motor-cars of that year, it is true, were only a side show, and consisted largely of electric vehicles.

It is a far cry, indeed, from the first show in 1901, in Madison Square Garden, under the auspices of the Automobile Club of America. The show committee and the club realized the need of an exhibition, in order that the public might become better and more intimately acquainted with the new means of mechanical propulsion. Many members of the club expressed the opinion that the show would not be a success financially, and the committee itself approached the matter with considerable diffidence.

The first show was a motor-car procession. What is meant by that is, it followed the horse-show idea, in that the cars were on view in various parts of the building, and in the center of the arena, while on a track around the arena the cars were observed under motion.

The 1902 show had a different novel feature (the track being abundant for lack of room), which was its exhibit of foreign cars, kindly loaned for the occasion by the members of the "400." This part of the show was located in the restaurant, and the names of the owners of the cars were placed upon them for the benefit of the general public. The cars bore also their characteristic nick-names, such as "White Ghost," "Red Devil," etc., the names of the makers and the fabulous prices that were paid for them.

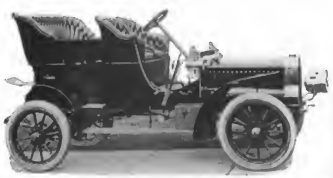
To tell the story of the congestion of the shows of 1903, 1904 and 1905 would be repeating only what is already familiar. New York needs, as the motor-car shows have conclusively demonstrated, a municipal show building. If it had such exhibition buildings as London has in its Crystal Palace and Agricultural Hall and Paris has in its Grand Palais, we might have an exhibition in New York in which the exhibitors could really "spread themselves."

Winter Skids Against Side-Slip

WINTER roads are prolific of conditions when the unaided motor-wheels are prone to side-slip, especially where, in passing another vehicle, the camber of the road is such as to add to the difficulty of regaining its crown. A few general axioms may seasonably be remembered by motor drivers. First. That some mechanical form of skidding prevention (as distinguished from merely a tire preservative) should always be available. Second. That it must vary according to whether the machine is driven by outside chain or a live axle; in the former case only those skids which are permanently and securely fastened should be used; in the latter a detachable form is permissible. Third. That both fore and aft wheels should be equipped.

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'Iroquois'



35-40 H.P., 4-cylinder, $2,500

An evolution in automobile development. Noted for quality, strength, mechanical excellence and low cost of maintenance

"IROQUOIS" are automobiles of rare merit and acknowledged reputation. The result of years of painstaking effort intelligently directed. They are equipped with a 35-40 H.P., 4-cylinder, water-cooled, vertical motor, mechanically-operated valves, jump-spark system improved clutch, sliding transmission gear, 3 speeds forward, one reverse. Spark and throttle control located on steering post, double-acting brakes. Elliptic springs in front, and scroll-end elliptic springs in rear, giving to the car an easy-riding motion and doing away with all jolts and jars. Reliable agents wanted. Prompt shipment after Feb. 16th.

Look for our Exhibit at the 69th Regiment Armory Show, January 13th to 20th, 1906

Iroquois Motor Car Co., Seneca Falls, N. Y.

ANNOUNCEMENT

HARRRISON

MODEL B 1906

The Maker Has done the Experimenting—The Purchaser gets the Perfected Car

SPECIFICATIONS

Four-cylinder, vertical, 35-40 H. P.; Motor Shaft Drive to rear axle; Special Sliding Gear Transmission, three forward speeds and one reverse; special design expanding clutch; Double Brakes, internal and external on rear hubs, Irreversible Worm Gear Steering; side-drive from seat (positive); Pressed Steel Frame, Timken Bearings; Semi-Elliptic Springs; Mechanically operated Valves; Positive Force Feed Lubricator (Madison Kipp); Ignition by Storage Battery and Jump Spark; Tubular Radiator.

Wheel Base 115 inches, Tread 54 inches, Tires 32x3 1-2, Speed 45 to 60 miles per hour.

Perfection in design attained after years of constant and intelligent experimenting by our engineering department. The knowledge thus gained of how an automobile should be made is followed in the construction of the Model B 1906 Car; trials of thousands of miles over all kinds of roads in all kinds of weather prove its ability to "stand up" and run under all conditions; nothing enters into the construction of the car but the very best obtainable—not what is merely said to be the best but—which we know by actual test to be the best; no part is neglected, each and every little detail that goes to make up the Perfected Car is given due attention.

The Maker has done the Experimenting—The Purchaser gets the Perfected Car

Catalogue now in preparation—send us your name for our mailing list.

ESTABLISHED 1850



Plant of Harrison Wagon Co.—15 acres

HARRISON WAGON CO.

STATION A

Grand Rapids, Mich, U. S. A.

See Exhibit N. A. A. M. Show, Coliseum, Chicago, Feb. 3rd.-10th

THE Loring SPEED-GAUGE "JAR PROOF"

SHOWS



SPEED
Miles per hour.
Minutes per mile.

DISTANCE
For season, to 10,000 and repeat.

For trip to 100 and repeat or reset to 0.

Hand steady under severest vibration. May be locked at any time for evidence. Mechanical in action, but unaffected by position, sway or shock. Flexible. Shaft shortest and most direct. Complete attaching fixtures, readily applied.

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E·J·LORING·SOMERVILLE MASS·

A Revelation in the Handling and Use of Gasoline

THE AMERICAN GENERATOR

For use in connection with all Internal Combustion motors.

Takes the place of your gasoline tank.

It carries no gasoline in liquid form.

Cannot possibly explode.

Cannot leak, no matter how many holes may be punched in it or how badly it may be torn in an accident.

Can be repaired as well by candle light as by electric light.

Can be surrounded by flame with all connections opened with no bad results.

Will greatly increase the power.

Will reduce consumption of fuel one-half

As no carburettor is used you have no more carburettor troubles to face.

Think of the absolute safety assured by equipping motor boats and automobiles with this device.

It has the unqualified endorsement of the insurance companies.

Write for copy of endorsement and descriptive circular of our device.

We will prove every claim we make.

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The New Book is Ready. Please send for it.

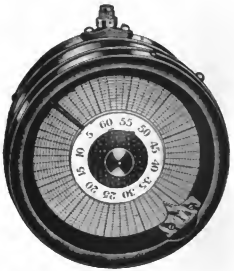


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Indispensable to Owners of Automobiles



Let the Cop Know the Speed you go

It tells you the time, speed, distance, and makes a permanent record on a card of every mile traveled, when and how long stops were made and the total mileage for the season.

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35 h.p. Hotchkiss $6,500

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A 1906 SPRAGUE TOP



On a FRANKLIN car, made the Sprague way, fine points and thorough workmanship. The Sprague idea—not how much but how well.

Visit our exhibits at both the New York shows or at Chicago show.

WE MAKE TOPS FROM YOUR BLUE PRINTS

SPRAGUE UMBRELLA CO.

NORWALK, OHIO, U. S. A.

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PREMIER *The Quality Car*

(Air Cooled)

Conspicuous in Automobile Construction

By virtue of its beautiful design, great power, speed, ease of carriage, simplicity of manipulation and accessibility, It embraces a 20-24 H. P., four cylinder vertical motor, 4 1-4 x 4 1-4 in. bore and stroke, bevel gear shaft drive, three speeds forward and reverse, Premier sliding gear transmission (mounted on five Hess-Bright type ball bearings), pressed steel frame, I beam front axle, 32 in. wheels, 4 in. Clincher tires, 104 in. wheel base, beautiful cast aluminum curved dash, sight feed precision oiler, cast aluminum hood front and fan, luxurious upholstering, rear seat 40 in. (measure the other cars), irreversible steering gear. Full gas and oil lamp equipment and generator, tube horn, and *brakes that hold*. Weight 1900 lbs. Altogether comprising a car the equal of which we believe does not exist at the price.



Price $2,250.00 F. O. B. Indianapolis

Write for Book of Road Experiences, and Catalogue "R"

PREMIER MOTOR MFG. CO., - Indianapolis, Ind.

Members American Motor Car Manufacturer's Ass'n.

KING AUTOMOBILE TOPS

The best possible tops at the lowest possible prices



The top is an important part of the equipment of the up-to-date automobile. If you want one with plenty of style, light in weight, yet strong and durable, investigate the KING line. It is the most complete on the market. Any style, any color, any size, made for any machine. Get our catalogue, samples and prices and you will not purchase elsewhere.

Prompt Shipments Guaranteed

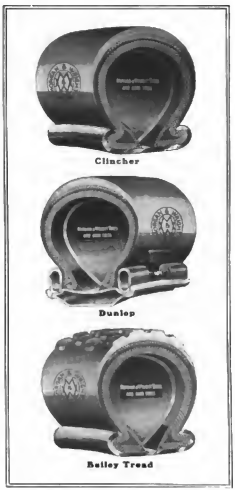
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Morgan & Wright Tires

HAVE COMMANDED
POPULAR FAVOR

Through Sheer Force of Merit



MERE CLAIMS to superiority have played comparatively little part in creating the widespread confidence which Morgan & Wright tires enjoy.

It has been the man to man, user to user, testimony—the voluntary declaration of actual experience—that has given the greatest impetus to their popularity and sale.

There is no method of making friends equal to the method of MAKING GOOD.

Making good! Everyday, everywhere making good! That is the real secret of the success of M. & W. tires.

Our 1906 product is a distinct advance in both practical and scientific tire construction over anything heretofore offered to automobilists.

We sincerely desire an opportunity to PROVE this to exacting tire-users.

Morgan & Wright
CHICAGO

NEW YORK, 214 West 47th Street
SYRACUSE, 216 South Clinton Street
PHILADELPHIA, Broad and Vine Streets
BOSTON, 220 Columbus Avenue
CLEVELAND, 347 Huron Street
DAYTON, 417 East 5th Street
MINNEAPOLIS, 706 Hennepin Avenue
DETROIT, 266 Jefferson Avenue
ATLANTA, 34 Edgewood Avenue
ST. LOUIS, 536 N Vandeventer Avenue
DENVER, 1062 Broadway
LOS ANGELES, 940 South Main Street
SAN FRANCISCO, 1067 Mission Street
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REMY 1906 MAGNETOS

The simplest and highest grade ignition apparatus that can be used with the four-cylinder automobile motor.

The electrical design is superior, and the mechanical construction equal to the best foreign made apparatus, and far above comparison with other American made mechanical ignition apparatus.



It is used upon more high-priced 1906 American made cars than all other Magnetos and Dynamos combined.

We will exhibit at Madison Square Garden and 69th Regiment Armory Automobile Shows in New York, and Chicago Automobile Show.

REMY ELECTRIC CO.
ANDERSON, IND.



"GEECEE"
Storage Battery

Unequalled for Automobile and Motor Boat Ignition and Illumination.

Higher in capacity and voltage than any wet Battery now on the market.

Acid (electrolyte) in suspended form, made dry by a secret process, can't spill or leak.

Perfectly safe in any position. No danger of acid eaten clothes, connections, etc.

As Easily Recharged as a Wet Battery.

A Layman can do it as well as an electrician when he uses the above charging outfit.

Full directions with each Battery and outfit.

By buying the "Geecee" you buy Miles, and you will know just how far you can go.

The same Battery that operates your ignition outfit will also furnish the required current to operate your Limousine light or a search light on your Motor Boat.



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We have the latest foreign novelties. If you need anything write us. Our prices are right and our goods are the best.

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THE IGNITION PLUG THAT MADE GRAND RAPIDS FAMOUS

Each plug guaranteed to give you 20 to 50 per cent. more power with the same consumption of fuel, no sooting or fouling. You cannot short circuit it with oil.

ASK YOUR NEIGHBOR ABOUT IT, HE MAY HAVE ONE OF OUR PLUGS

TESTIMONIAL

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LAIRD MANUFACTURING COMPANY

Successors to Falls Manufacturing Company

Manufacturers of FIBRILLOID AND HARNESS TRIMMINGS

Office and Factory, 500 Pierce St., N. E.

Minneapolis, Minn., Nov. 5, 1905.

The Continental Engineering Co., Grand Rapids, Mich.

Dear Sir—Yours of the 10/26th at hand. In reply will say the name of my car is the Autocar. I have owned it since last March. I do not know what kind of plugs there were on the car. There is no names on them. I will send you cut of engine and car. The Spark Plugs I bought from the Continental Engineering Company are working fine. My car is supposed to be twelve horsepower but since I have changed the plugs I can go on the high gear now with four people where I could not go before with two people. My engine runs stiller and does not knock when I run it hard. Yours truly, E. J. LAIRD.

We have hundreds of testimonials from different parts of the world. Ask Harrison Wagon Works, Grand Rapids, Mich., or any bank in our city as to the merits of our plugs, or our ability to deliver promptly.

Any manufacturers, either in this country or abroad, wishing to make our plugs, can do so by paying us a few cents royalty on each.

These inventions are protected in every country in the civilized world, and parties trying to infringe the same will be vigorously prosecuted.

$500 will be paid to persons sending us the name of any one trying to infringe our rights and sufficient evidence to convict them.

CLIPPING

Grand Rapids Press, Tuesday, December 12, 1905—Autoists and Manufacturers like E. J. Pennington's Spark Plug—Making them here—

Gives greater power on the same consumption of fuel

E. J. Pennington, widely known a number of years ago as a builder of air ships and likewise the maker of the first motor cycle, and the first automobile produced in this country, taking the same machines to London, England, in November, 1898, the records show that these were the first Motor Bicycles and Automobiles ever seen and used in London. They were all shod with pench pneumatic tires, made by an Akron Ohio Rubber Co. Mr. Pennington has formed The Continental Engineering Co., for the purpose of manufacturing and marketing his invention, a Spark Plug. The plug he is manufacturing in his own plant, on Huron Street, in this city, but large orders are being cared for in other machine shops. Mr. Pennington having placed a hurry-up order for 200,000 of the plugs to fill orders. Of this number 100,000 are to go to Europe, and one Chicago house takes 10,000; Cleveland house, 10,000; Buffalo, 10,000; Pittsburg, 5,000; Philadelphia, 10,000, and the New England cities 20,000.

During the last few months the plug has been used by many automobilists of this city, and it is claimed by all users that it gives high satisfaction. It is producing anywhere from 20 to 50 per cent. more power with the same expenditure of electricity and gasoline than any other plug on the market, and that this claim has been vindicated in the frequent demonstrations made in this city and in other places.

Price $2.50. Any owner of an automobile may procure a plug from us for each cylinder of his car by sending us $2.50 for each plug with order. This order holds good for fifteen (15) days from the date of this advertisement. After the fifteenth your Garage will furnish same to you at $2.50.

All remittances must be sent to the National Express Company, Grand Rapids, Mich., with instructions to deliver the same to us on receipt of plugs addressed to purchaser in good condition.

Sending your order specify make of car, year of make, thread Metric, or U. S. Standard, Mica or Porcelain.

Address all inquiries to the Factory, Grand Rapids, Michigan.

Notice—No purchaser will be allowed to buy more than four (4) plugs at the above price.

Grand Rapids, Mich., Dec. 16, 1905.

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The LENOX HOTEL
IN BUFFALO



Modern—Highest Grade —A model of Fireproof construction.

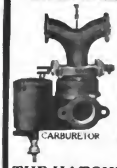
A favorite rendezvous for Automobile Tourists

European Plan
Rates $1.50 per day and upward

Wire Reservations at our Expense

North St., at Delaware Ave. GEORGE BUCKSCHEKER, Prop.

THE HATCHER AUTO-PARTS CO.



WE WILL PROVE

any and all automobile parts that we manufacture by allowing thirty days' trial; in fact we prefer to deal in this way with our customers.

Our reputation for manufacturing reliable and practical automobile parts was established years ago, so that now our Guarantee means that everything we manufacture is as near perfect as science, material and skilled workmen can make them.

Our carburetor is automatic and furnishes a perfect mixture at any speed; in all kinds of weather. They are made to fit any style engine.

Send for complete catalogue of parts.

THE HATCHER AUTO-PARTS COMPANY
Mechanical Engineers, Constructors and Manufacturers of Automobile Parts and Specialties
150 VIADUCT . CLEVELAND, OHIO
Successors to The Brew-Hatcher Co.



Repair Shop



HAVING a complete and fully equipped repair shop for gasolene, steam and electric cars, we are able to turn out first-class work. Estimates willingly given to trade and private individuals.

Mechanical, Painting, Trimming, Body and Battery Work.

Majestic Automobile Co.
1709-11-13 Broadway
NEW YORK CITY
GEORGE H. MULLIGAN, Mgr.

THE PARIS SHOW

(*Continued from page 61*)

more numerous forms, one type being on the well-known Eisemann plan, in which a separate coil is used, and the contact breaker is in parallel with the primary of the induction coil. The other types include the Lacoste, Simms-Bosch, Calida and the Gianoli, the last named having some unusual features. The make-and-break is operated magnetically instead of by mechanical means as in the other types, and the timing is influenced by a partial rotation of soft iron sleeves lying between the armature and the field magnets, but just out of actual contact with it, so that it is impossible to break the circuit when the armature current is not strong enough to make a spark. In a new one called the



EXTERIOR VIEW OF GRAND PALAIS

Rapide the induction coil is carried in the arch of the field magnet, the limit of advance and retard being forty degrees, the peculiarity being there is no difference between the quality of the spark throughout the entire range of the lead or retard when the armature is rotated at a very moderate speed.

Lubrication is not as wasteful as heretofore, pressure only being used to carry the oil from the tank to the dashboard, falling from there to its objective points by gravity.

Cylinders cast separate were common. Renault Frères showed a one-piece four-cylinder motor. The disk clutch is gaining in favor very rapidly abroad, as the show evidenced, with the cone clutch still in the lead. The greatest variety, however, exists in the matter of carburetion. Most of the carbureters were automatic, but no two are exactly alike in design, but most of them were fitted with an extra control by means of a hand lever.

Frames were very largely narrowed in the front in order to give a greater steering radius. Brakes have received a large share of attention from the foreign makers, the tendency being to have them water cooled now. An additional tendency noticed was to put an extra brake on the countershaft, and in some few instances on the gear-box lay shaft.

One of the most striking features of the show was the number of



FROM THE U. S

closed cars, and these embraced not only touring, Limousine and Berline, but low-powered and low priced town cars. These town cars were largely in the shape of a coupé or brougham rather than of a landaulet, and in many of the displays the motor was under the driver's seat with a simple dashboard in front of him.

(*Continued on page 170*)

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GROUT

SEE OUR EXHIBIT
AT THE
Automobile Club
Show
69th Regt. New Armory
26th St., near 4th Ave.
NEW YORK



GROUT CARS
are simple in operation,
and strong
and durable
in construction

Price, $2500, including Top, Headlights, two Oil Lights, Horn, Baggage Rack in Rear and a full Set of Tools.

GROUT GASOLINE CAR

30-35 Horsepower, 4 Cylinder balanced motor, high tension ignition, using one coil with distributing commutator
Great attention has been given to our oil and electrical systems

GROUT AUTOMOBILE CO., ORANGE, MASS.

New York Office and Salesroom, - - - MUNSING & CHAPMAN, No. 1185 Broadway

SPLITDORF

PERFECT IGNITION

Proved in Speed Contests, Automobile
and Boat, in nearly every event in 1905

SEE OUR LINE AT BOTH SHOWS FOR DETAILED INFORMATION

DON'T MISS OUR EXHIBIT

C. F. SPLITDORF

17-27 Vandewater St. New York City

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"SOOT-PROOF" PLUGS



It was real merit that made the "Soot-Proof" Spark Plugs win the McMurtry Medal in the Six Day National Economy Contest. Ninety per cent. of all contests won in America were won by cars using "Soot-Proof" Plugs. Specify them when ordering cars. It will save you trouble. Imitations? Sure, but that's flattery.

INDESTRUCTIBLE, $2.00 REGULAR, $1.50, GUARANTEED

YOUR JOBBER HAS THEM

C. A. MEZGER, Inc., 203 W. 80th Street, New York

NATIONAL SALES CORPORATION, Factory Sales Managers, 260 Broadway, New York

"National Batteries" FOR ELECTRIC VEHICLES

NEW YORK CITY BATTERY DEPOT: SMITH & MABLEY, Inc. 57th ST. & BROADWAY

RELIABLE

National Battery Company

ELECTRIC STORAGE BATTERIES

BUFFALO, N. Y.

"National Sparkers" FOR GAS MOTORS

BRANCH OFFICES: NEW YORK CHICAGO

RADIATOR MONOGRAMS ANY SIZE ANY STYLE ANY NUMBER OF LETTERS $6.00

S. D. CHILDS & COMPANY 200 Clark Street, CHICAGO

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(PETO-CADETT PATENTS)

RECHARGEABLE on DIRECT or ALTERNATING CURRENT

10% Higher Voltage. 20% Higher Capacity

UNSPILLABLE

ROOM 910 POSTAL TELEGRAPH BUILDING, NEW YORK CITY

Reliable Firms Desired as Special Agents

AUTOMOBILE SPECIALTIES

WE WANT CONTRACTS for Transmissions, Carburetors, Oilers and other Automobile parts. Full equipment and capacity for completing large contracts promptly. We have made steam goods for 20 YEARS—no experiment in intrusting your work to us. Last season we made parts for some of the largest motor car makers, and this season will do much more. Accurate work only. Send blue print, stating your wants and get estimate. Correspondence solicited. Special Gear Cutting.

THE LEE MFG. CO. : 2,100 Carver St., Port Huron, Mich.

"In a Class by Itself"

Linseed Oil Auto Soap

It Removes Dust, Oil and Grease—Everything but the Lustre and Varnish. Makes Old Cars Look Like New. The Base of this Soap is Linseed Oil, the Life of Finish. Sold in five, ten and twenty-five Pail Lots, also in half barrels and barrels. Used by all the principal Automobile Factories. Manufactured by

Rome Soap Manufacturing Company, Rome, New York

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ERIE

ERIE . . . RAILROAD

THE PICTURESQUE TRUNK LINE OF AMERICA

LUXURIOUS VESTIBULED TRAINS

consisting of Sleeping Cars, Dining and Cafe Cars and Day Coaches

DAILY SERVICE BETWEEN

New York and Buffalo, Niagara Falls, Cambridge Springs, Cleveland, Cincinnati, Chicago.

Stop-over is permitted on all through tickets at Niagara Falls and Cambridge Springs. For particulars apply to any Erie ticket agent, or the undersigned.

All Trains Protected by Block Safety Signals
The Erie Dining-Car Service is Unsurpassed

R. H. WALLACE General Passenger Agent NEW YORK



New Lackawanna Terminal

IN

NEW YORK CITY

The Lackawanna Railroad now enters New York through a new gateway—West 23d Street. The imposing terminal opened there means added convenience for Lackawanna patrons. It means immediate access to the very heart of the great hotel, theater and shopping districts. It means a positive saving in time in reaching the uptown residential sections. It suggests one of the many reasons why the Lackawanna Railroad is the best way between

Lackawanna Railroad

New York and Buffalo

Superior through car service between New York, Buffalo, Chicago and St. Louis.

LAKEWOOD



The Fashionable Fall Resort of America

REACHED ONLY BY

NEW JERSEY CENTRAL

Best Hotels Golf Polo Coaching

Booklet on application to C. M. BURT, General Passenger Agent, 143 Liberty St. New York City

Dustless Motoring



BROWN'S DUST GUARDS absolutely eliminate the dust nuisance in motoring

Guaranteed to give satisfaction or money refunded

The following is only one of many expressions from satisfied users:

Bloomington, Illinois, June 13, 1906

W. H. Brown,
Chicago, Ill.

Dear Sir:—

We herewith send you remittance to-day for your invoice——. Our customer to whom we sold these wisely told us to-day that they were worth ten times their cost. He said he would not sell them for $100.00 if he could not get another set just like them. How soon could you furnish a set of guards for Model H Winton car——?

Yours Truly,
The Kaiser-Yale Lyer Co.
By H. C. Kaiser, Sec'y & Treas.

Made to fit any automobile. Write for booklet. Visit our exhibit at the New York Auto Show, 69th Regiment Armory, Space 30 in Gallery.

W. H. BROWN, 204 Larwe Building, CLEVELAND, OHIO

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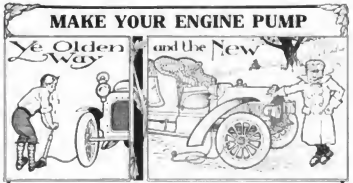
A.O. SMITH COMPANY.



MILWAUKEE, WIS.

THE
NEWMASTIC FILLING
MAKES PUNCTURES IMPOSSIBLE
ADAPTED TO CLINCHER and SINGLE TUBE TIRES
Prolongs the life of the tire, making it practically indestructible, and
AS SAFE AS A SOLID TIRE
Does not affect resiliency. Write for particulars
NEWMASTIC TIRE CO. St. Louis, Mo.
CHICAGO, ILL., and LOS ANGELES, CAL.

MAKE YOUR ENGINE PUMP



USE THE P. T. C. POWER TIRE PUMP
Save time and trouble and increase the life of your tires by keeping them properly pumped up.
The Pacific Tucking and Mfg. Co.
471-473 18th Street, - Brooklyn, N. Y.

Mercedes

If you have a Mercedes Car and want any parts, we can furnish them. Or any repairing, we can do it.

National Automobile Co.

TELEPHONES 1888 1889 79th ST.

Yorkville Garage 205-7-9 E. 86th St.
Machine Shop 517 E. 73d St.
NEW YORK CITY

THE PARIS SHOW

(*Continued from page 166*)

All the makers went to great pains to provide different lengths of chasses suitable to the different styles of bodies, so that on the whole the chassis length has become longer than heretofore, especially so on chain-driven cars, and all of this has brought with it weight, so as to give a maximum of strength in proportion to the increased length.

A brief account of some of the more interesting exhibits follows: Renault Frères showed a new type of chassis of 35-40 m.p. which we shall describe later on. Alongside of it, they exhibited a 20-30 m.p., a



14-20 m.p. and a 10-14 m.p. chassis of the 1905 type modified and improved. The house also presented a new suspension, the principle of which is based upon a novel application of liquid brakes.

The Richard-Brasier establishment exhibited three new types: a 15 m.p. 4-cylinder car, with cardan drive; a 25 m.p. 4-cylinder car, with chain drive, and a 50 m.p. 4-cylinder car, with chain drive.

A 15 m.p. car, with landaulet body, gives prominence to the qualities of this chassis as a city carriage.

The Panhard-Levassor establishment exhibited a 35 m.p. chassis; a 15 m.p., with Rothschild body; a 24 m.p. Limousine, with Binder body; a 24 m.p. cab Limousine, with Henri Labourdette body, and a 24 m.p.

The 1906 types are six in number, of 8, 10, 12, 15, 20, and 40 m.p., respectively.

The Mors stand comprised two demonstration chassis, one of 17 and the other of 45 m.p., and, in addition, four cars mounted by Rheims and Auscher, one of 45 and three of 28 m.p. Upon the demonstration chassis were observed, among other interesting things, a new metal clutch and a new lubricator and some new brakes, one of which, in particular, a compound one, is mounted upon the 45 m.p. car.

The Mors' establishment also exhibited, in addition, a 7,700 pound truck, an omnibus, four trial cars, one of 45, one of 28 and two of 17



m.p., which were at the disposal of prospective purchasers desirous of acquainting themselves with the qualities of the vehicles.

At the stand of Charron, Girardot & Voigt were: City chassis of 14, 20 and 75 m.p.; a Limousine coupé, by Rothschild; a landaulet, by Muhlbaecher; a city coupé, by Rothschild; and a city three-quarter coupé. All the chassis exhibited were of the new 1906 type, embracing numerous improvements, among which are the following: a Court carburetor that permits of slowing down or increasing the velocity of the motor instantly, and a suspension, with transverse spring, which assumes a remarkable ease of running. The speed boxes, the chain sprockets and the wheels all provided with ball bearings. The steering post is of a new model. The motor is provided with a double ignition by magneto and accumulator. It is possible while underway and without dismounting to change the ignition instantaneously by connecting the motor with the magneto or the accumulator

(*Continued on page 174*)

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Motoring Satisfaction

Is More a Matter of the USER'S KNOWLEDGE than of the Car's Quality

A Green Motorist we knew paid $2,500 of Real Money for a brand-*new* automobile, of one of the Best Makes.
He Ran it Himself for several weeks, and all went well—no failure of the Motor to Start, no Missing of Ignition, no Punctured Tires, no troubles of any sort.
He had taken his wife, and his children, and his friends, and some of his enemies, for Long Runs, and was fully convinced that there was more of Sport and Utility in the New Conveyance than in any other Mechanism that ever was contrived.
Then, *one* day when he was driving alone—Twenty Miles from Anywhere—the motor stopped.
He Cranked It, Tested the Ignition, Adjusted the Mixture, and did all of the other things he had heard mentioned by the selling agent—whom nature.
Having thus wasted two hours of his Valuable Time, he walked three miles and found a Man with a Horse, who towed the machine into the Nearest Barn, charging five dollars for the service.
A dollar *more* went for railroad fare back to the City; and the Expenses, and Time, and Other Charges of the Repairman who was sent out to fix things up came to twenty-five dollars.
The total of these items was Thirty-*five* Dollars and a lot of Hard Work—more than the price of one of our courses.
Then the trouble and understanding it—and the difficulty was a gram of sand in the atomizing nozzle of the carburetter, which any one who *knew* what he was about could *find* and *remove in three minutes!*
It Might Have Been Worse—it might have been something wrong with the Cooling System, which would have Overheated and Ruined the Engine; or with the Lubricating Devices, which would have Spoiled a few Bearings; or with the Brakes, which would have caused a Bad Accident.
And any *of these* would have cost *twenty times the price* of one of our Courses, which explain in *simple* and *practical* ways, with *plenty of illustrations*, just what every motorist *needs to know* and *can easily understand* about his car.
Our automobile instruction is the kind that is *used right*—the kind that is so *demand* and *understood* and *remembered* that *more people* grasp it by *just reading it.*
Ours is *not* the sort of literature that is laden with mathematics and formulas, and that is written to *show* that the writers know, instead of to *tell* what they know.
It is the work of well-known experts—experts who know their business—but it is *prolixated*, rather than technical, and it proves as interesting to the average motorist as does a Nick Carter to a hurrying messenger boy.
Now, if you *want* the sort of *information* that makes a Know car *with it* better than a Know car *without it*—the sort of information that confers *knowledge* without hurting the insides of people's heads, you had better write for our prospectus.
This prospectus explains the details of our motor boat, motorcycle, and automobile courses, and answers the questions that cannot be answered here. It also shows how our work is endorsed by prominent manufacturers, club and association officials, racing men, trade-paper editors, and others whose standing in the automobile industry lends authority to what they say.
Just a moment of time and a postage stamp, and the prospectus is yours for the asking. Write now, to

THE CORRESPONDENCE SCHOOL OF AUTOMOBILE ENGINEERING

FILL OUT TEAR OFF MAIL TO-DAY

The Correspondence School of Automobile Engineering
Suit 1348, Flatiron Building, New York City

Please send to my address by return mail, a free circular, giving full particulars of your correspondence courses.

Name.....

Street and No.....

City..... State.....

Or write for circular without detaching coupon.

AMERICAN TOP CO.

AUTOMOBILE TOPS

LARGEST TOP FACTORY IN UNITED STATES

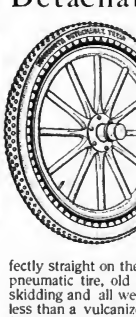
If you are looking for the highest grade Auto Top, we have it. : :

Every variety but the CHEAP LEATHER-COVERED BOW SOCKET TOP.

AMERICAN TOP CO.
Jackson, Michigan

Capacity, 300 Tops per week

The 1906 Woodworth Detachable Tread



IS perfect in every particular. It can be applied in 15 minutes, and requires no tools but a pump. Simply deflate the tire, slip the cover over it, connect the ends of the wire side-ropes, blow up the tire, and it is ready for use.

Our new semi-flat tread greatly increases the wearing surface, and makes the tread maintain its position perfectly straight on the tire. Suitable for any make of pneumatic tire, old or new. Prevents punctures, skidding and all wear of the tire surface. Costs less than a vulcanized tread, and is much better for it does not weaken the fabric. Write for circular and prices.

LEATHER TIRE GOODS CO.
MAKERS
Newton Upper Falls, Mass.

HEINZE MOTOR CAR COILS



The fastest acting coil on the market; giving a very hot flaming spark and of great frequency and consuming only 2-10 of an ampere.

Try one and be convinced, and you will write us that you have never seen your engine run so fast before in your life and that you would not be without a HEINZE COIL and would advise all your friends to use them. This is the kind of reports we get every day from users of our coils.

We make everything in the line of coils from a jump spark to vibrating coils, from a plain to a dash board type and for one to four cylinder engines.

Send for our latest circular and description.

Do not fail to look us up at the Licensed Automobile Show in New York, Booth No. 221.



Manufactured by

Heinze Electric Compy
LOWELL, MASS.

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WE WIN

BECAUSE WE HAVE THE GOODS



For Automobiles
Stationary and
Marine Engines



DODGE POSITIVE FORCE FEED OILERS

Absolutely Automatic, require no attention. They are not eye servants, but can be absolutely relied upon in all weathers and under all conditions. The greater the speed, the more oil is delivered to the parts, and when you stop the flow of oil stops. No valves to open, no valves to close. *No blue smoke,* consequently no waste of oil.

Either pulley, ratchet or sprocket drive. Made in polished brass or iron.

SEND FOR CATALOGUE AND PRICE LIST

Manufactured by DODGE LUBRICATOR CO., 36 Columbus Ave., Boston, Mass.

Factory Sales Managers National Sales Corporation, 256 Broadway, New York City, N. Y.

DOLSON
AUTOMOBILES
THE NEW 1906 MODELS

Model "F," 45-50 H. P. 4-Cylinders, 5 in. by 5 in. 110 in. Wheel base, Alminum Body. **$2,500**

Model "E," 28-32 H. P., 4 Cylinders, 4¼ in. by 4¾ in. 108 in. Wheel base, Steel Body. **$1,800**

Model "D," 20-24 H. P., 2 Cylinders, 5½ in. by 5 in. Opposed under Hood, Pressed Steel Frame **$1,500**

Model "C," 20-24 H. P., 2 Cylinders, 5½ in. by 5 in. Opposed under Body, Trussed Steel Frame **$1,250**

Complete advance information of above models is ready. Will be at the New York, Chicago and Boston Shows.

DOLSON AUTOMOBILE CO.
306 LOVETT ST., CHARLOTTE, MICH.

NATIONAL COILS

For 1906



Highest Possible Speed of VIBRATORS

Non-Sparking at Platinum Points

Insulations of Windings Absolutely Perfect

Write for full information regarding the radical features incorporated in our new line.

NATIONAL COIL CO.
Lansing, Mich., U. S. A.

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THE CAR OF 1906

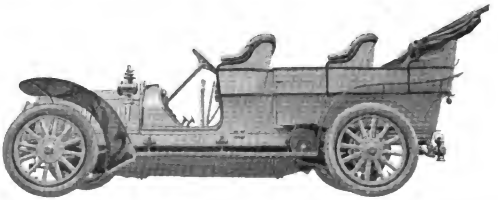
20 h.p. 24 h.p.
40 h.p. 70 h.p.

Delaunay Belleville

A Few of the Special Features

Absolute Silence
Removable Coverings under Gear and Engine
Special Design of Radiator and Fan
Unique Flexibility
Special System of Spring Suspension
Entire absence of Grease and Oil from Dashboard

Constructed by the famous engineers to the French and British Navies



GOLD MEDAL—PARIS SALON

SOLE UNITED STATES AGENTS, THE

PALAIS DE L'AUTOMOBILE

A. C. NEUBAUER

500 FIFTH AVENUE, NEW YORK

Corner 42d Street, Bristol Building — Telephone 1223-4 Bryant

PARIS, 218 BOULEVARD PEREIRE

The Palais de L'Automobile will also handle as extensively as in the past the well-known cars of

PANHARD AND LEVASSOR AND RENAULT FRERES

Will exhibit in A. C. A. Show, 69th Regiment Armory, January 13th to 20th. Space A 1

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Veeder

"It's Nice to Know How Far you Go."

—Veeder Odometers.

THE VEEDER MFG. CO.
24 SARGEANT STREET
HARTFORD, CONN.
Cyclometers, Odometers, Tachometers, Counters and Fine Castings

MADISON SQUARE GARDEN SHOW
Manufacturers! Owners!!
It will pay you to look for our Exhibit of the newest styles in tops for 1906 cars

Best Shapes
Newest Features
Best Materials
Lowest Prices



Springfield Auto Top & Upholstering Co.
102-106 Dwight St. : Springfield, Mass.

St. John Non-Puncture Auto Tire
Space J, Basement
69th Regt. Armory
Automobile Show
January 13th to 20th

THE HAPPY MEDIUM
The St. John Solid Rubber Cushioned Tire

The greatest tire man's ingenuity ever produced.
The tire that solves the most vexing problem now presented to both the manufacturer and private owner of automobiles.
It cannot PUNCTURE. Perfect resilient cushion. Has no one-sided the power now expended on otherwise. Fits regular Single and Clincher rims. Easily applied.
Adopt our tire and save annoyance and expense.
Write for our 1906 Catalogue, with testimonials, etc.

THE ST. JOHN RUBBER TIRE CO., Inc.
110 Broad Street New York
69th Regiment Armory, Jan. 14-20, in Basement

Auto and Cycle Tire Manufacturers



80 WEST 40TH ST., NEW YORK
Select Restaurant
SPÉCIALITÉS À LA CARTE
DÎNER TABLE D'HÔTE, $1.50
SUPPERS DELIGHTFULLY SERVED
Music and Singing by Troubadours
Private Dining-Room for Parties of four or more
Telephone 6046—38th St.



Forbidden Fruit
A New and Exquisite Cordial
A delicious blend of the juice of the finest selected Grape Fruit and the best old Cognac Fine Champagne.
At all Grocery, Cafes and Restaurants.
BUSTANOBY FRERES
80 West 40th St.
Distributers.

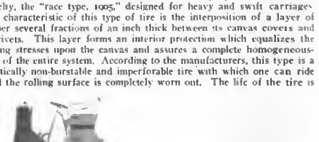
THE PARIS SHOW

(*Continued from page 170*)

The 20 and 30 m.p. models have the usual speed box, with two parallel shafts, and the engagement direct on the fourth speed. The 50 and 75 m.p. types have a double sliding-gear speed box.



At the stand of the Samson Leather Tire Company was shown, as a novelty, the "race type, 1905," designed for heavy and swift carriages. The characteristic of this type of tire is the interposition of a layer of rubber several fractions of an inch thick between its canvas covers and its rivets. This layer forms an interior protection which equalizes the rolling stresses upon the canvas and assures a complete homogeneousness of the entire system. According to the manufacturers, this type is a practically non-burstable and imperforable tire with which one can ride until the rolling surface is completely worn out. The life of the tire is

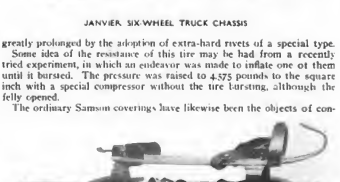


JANVIER SIX-WHEEL TRUCK CHASSIS

greatly prolonged by the adoption of extra-hard rivets of a special type.

Some idea of the resistance of this tire may be had from a recently tried experiment, in which an endeavor was made to inflate one of them until it bursted. The pressure was raised to 4,575 pounds to the square inch with a special compressor without the tire bursting, although the felly opened.

The ordinary Samson coverings have likewise been the objects of constant improvement. The house is having special apparatus made for the manufacturer of them.



FOUR-WHEEL MOTOR SKATE, DIRECT DRIVE ON REAR AXLE, FRONT WHEEL STEER. TWENTY-FIVE MILES PER HOUR. $120 PER PAIR

At the stand of the Michelin Tire Company was exhibited the new pneumatic called the "Semelle Michelin," which is both non-skidding and impretorable. This, along with a new lever designed for the dismounting of tires, is the Michelin novelty for the coming year.

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An Important Announcement
Concerning

OLD ENGLISH

BLACKJACKS

THE Gorham Company desires to direct attention to its extremely novel and original collection of Loving Cups and Tankards, offered under the name of "Old English Blackjacks."

THESE have been designed especially to meet the very wide-spread demand for articles of this nature which shall be as dignified and as decoratively effective, but yet not so costly as though fashioned of solid silver. They are made closely to simulate the Old English "Blackjacks" and "Leathern Bottels," those characteristic drinking utensils of the sixteenth and seventeenth centuries, which are to-day so eagerly sought after by collectors of artistic rarities.

THESE strikingly original examples of an artistic revival are to be found in all sizes from the drinking mug to the imposing Loving Cup, the tall Tankard or the well-proportioned Flagon. The bodies are of heavy hand-worked leather, the linings of red copper, the mountings, including the shields for monograms, inscriptions or armorial bearings, of sterling silver.

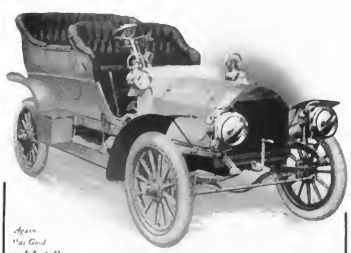
BLACKJACKS are exclusively made by The Gorham Company at very moderate prices, from five dollars upward, and are to be obtained from the important jewelers throughout the country, as well as from the makers.

THE GORHAM COMPANY

SILVERSMITHS & GOLDSMITHS

FIFTH AVENUE AND THIRTY-SIXTH STREET, NEW YORK

(The New Gorham Building)



Apex
"the Good
as It Looks."

The Parlor Car of Motor Cars

Talk of luxury! The roomiest of seats—splendid cushions that take you into their generous depths and make you forget there was ever an angle to ache mortal spine.

Well, that is the kind of rich comfort you find in the STODDARD-DAYTON Touring Car.

But there's more than fine upholstering to contribute to your ease.

The STODDARD-DAYTON has every *practical* modern device that takes up jar and reduces vibration. The springs are single elliptic—40-inch front, 50-inch rear, made from best crucible analysis steel. There are roller bearings throughout. Mechanical lubrication keeps all working parts swimming.

The STODDARD-DAYTON Model D, 5-passenger Touring Car has a special type of 4¼ x 5-inch, 4-cylinder motor; water-cooled; frame of hot-rolled, high carbon, pressed steel, sliding gear transmission; three speeds and reverse—selective type, speeds can be changed instantly without clashing or friction; practically noiseless; entire transmission on roller bearings; mechanical lubrication; 30 to 35 horse power. Proportion of power to weight, one horse power to every sixty pounds. $2250. Immediate delivery.

Write for our 1906 book. Interesting to any one who owns a car or intends to own one.

The Dayton Motor Car Co., Dayton, O.

Agencies in the following cities: McDuffee Automobile Co., 1440 Michigan Ave., Chicago. Stoddard-Dayton Agency, 1833 Broadway, New York; Hamilton Automobile Co., 200 North Broad St., Philadelphia; Central Automobile Co., 5080 Centre Ave., Pittsburg; J. A. Cramer, 737 Main Street, Buffalo; Randall Motor Car Co., 56 Columbus Ave., Boston; Colonial Automobile Co., 2944 Olive St., St. Louis; Dwight Automobile Co., Omaha; H. S. Moore, 1360 Crawford Road, Cleveland; Automobile & Supply Co., 24 Temperance St., Toronto; Norman W. Church, Heilman Bldg., Los Angeles, Cal.; Haynes Automobile Co., 220 South 6th St., Minneapolis, C. M. Wood, Denver. Fisher Automobile Co., 250 North Illinois St., Indianapolis.

Stoddard-Dayton

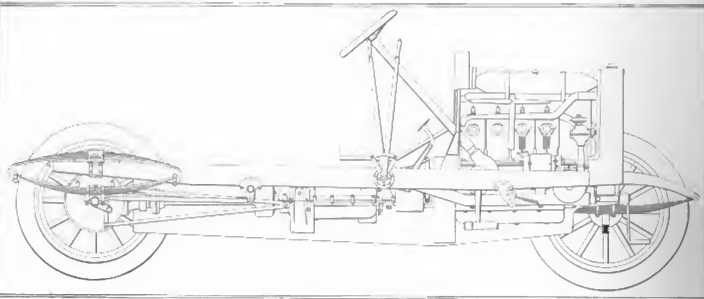
Model D

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MOORE AUTOMOBILE COMPANY

571 FIFTH AVENUE

NEW YORK



MOORE 40 H. P. CHASSIS

"THE BALL BEARING CAR"

EVERY REVOLVING SHAFT ON BALL BEARINGS

SIMPLICITY IN CONSTRUCTION AND OPERATION

=:Hotel Belleclaire:=

Broadway and 77th St. : NEW YORK



ABSOLUGELY FIREPROOF

MOST ACCESSIBLE LOCATION in the city. By Subway from City Hall and Brooklyn Bridge in 15 minutes.

LUXURIOUSLY FURNISHED ROOMS for permanent and transient guests, at moderate prices.

ORCHESTRA OF SOLO PLAYERS, 6 p.m. till 1 a.m.

RESTAURANT, PALM ROOM AND CAFE—gems of artistic perfection. Cuisine and service really delightful.

A SPECIAL FEATURE IS OUR AFTER THEATRE SUPPERS.

BILLIARD PARLOR FOR LADIES is another pleasant feature.

OUR GALLERY OF BEAUTIFUL PAINTINGS, valued at $50,000, is open evenings to visitors.

AFFABILITY AND COURTESY guaranteed from every *BELLECLAIRE* employee.

MILTON ROBLEE,

PROPRIETOR

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From this



136 WEST 38TH STREET

Only five years ago the establishment now known as the Decauville Automobile Company was founded. Within that brief time the rapidly increasing business has outgrown its modest quarters, expanded into three large branches, and now demands even greater facilities. An immense plant has been in process of building for many months, and will be formally opened to the automobile public on January 7th. With every modern appliance, this will be the largest and best equipped garage in the world.

It is especially urged that all persons interested in the broad subject "The Automobile" take time to look over this great organization.

Visitors from out of town during Show Week

whether intending purchasers or not, will find here an interesting and instructive display of all that pertains to the automobile, a genuine automobile exposition

to this

That IMPORTED Decauville CAR

"That Steel Pan"
"That Live Axle"
"That Decauville Engine"



because of that

To meet the varying demands of the whole American Public, this new garage has been made the New York headquarters of the Franklin, C. G. and V., and English Daimler Cars, in addition to "That Decauville Car." A large variety of these cars is always on hand for inspection and demonstration, as well as a complete stock of parts and attachments.

Don't fail to visit the largest and most complete garage in the world

An eminently successful business organization, a complement of cars of demonstrated mechanical superiority, an enormous line of accessories and specialties, the largest and most complete garage and repair shop in existence—these all combine to make this new establishment the automobile centre of the world. If you can't come, write for catalogues.



30-35 H. P. Touring Car

DECAUVILLE AUTOMOBILE CO., New York

AGENTS FOR

Decauville
Franklin
Gabriel Tire

C. G. & V.
English Daimler
D. A. C. Auto Specialties

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WALKER



¶ **The Walker Runabout** is offered to the public as a car capable of carrying two passengers; artistic in appearance and up-to-date in construction and design.
¶ We have not aimed to build a racing car but one for practical use.

¶ While this is our first season with this style of car we have had years of experience in the construction of gasoline motors and can frankly say that no machine of this class has fewer parts.
¶ Among the many strong features of our runabout are the simplicity and accessibility of the engine. We have constructed the crank case and the transmission case in one casting, making the whole engine oil proof, and the fact that the engine is placed under the hood gives free access to the various parts without taking the machine to pieces.
¶ This runabout is just what the public are looking for; easy running, noiseless and one which can get over the ground quickly and with very little cost.

If you are interested in a machine of this kind we shall be pleased to have you investigate the merits of The Walker Runabout.

SPECIFICATIONS

Cylinders—Two, double opposed type 4 x 4, developing 10 H. P. at ordinary speed. Located under the hood, making all parts accessible.

Valves—Intake and exhaust valves are interchangeable and are mechanically operated, the valve openings are 1½ inches in diameter.

Transmission—The planetary type is used, two speeds forward and one reverse. The crank case and transmission case are combined in one casting, the transmission being enclosed. Speed from four miles per hour to twenty-five miles per hour on direct drive.

Drive—Direct shaft drive, bevel gear on rear axle using double universal joints, giving the runabout an easy running motion. The advantage of a shaft drive is that it does away with the filthy and noisy chain.

Oiling—The bearings of the engine and transmission are automatically oiled by four sight feeds which are connected to a compression force feed oiler located on the top of the crank case, giving perfect lubrication at all times.

Chassis—Angle steel frame, 1¾ x 1¾ x $\frac{3}{16}$.

Wheels—Artillery pattern 28 x 3 inches. Whee base 78 inches. Standard tread.

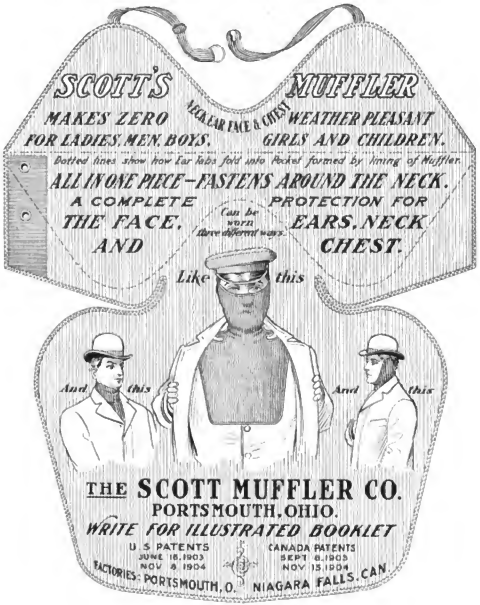
Tires—3 inch clincher or detachable tires.

Tank Capacity—Gasoline 8 gallons. Water 2½ gallons, all contained in the radiator and a continual circulation by means of a gear pump, giving the water a perfect circulation.

Ignition—By jump spark with coil fastened on the dash in front of operator

WALKER MOTOR CAR CO., 109 Fort St., Detroit, Mich., U.S.A.

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The APPLE for 1906 Ignition System



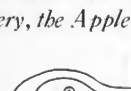
Spark Plugs

The complete system consists of the Apple Automatic Storage Battery Charger, the Apple Storage Battery, the Apple Automatic Cut-Out with all necessary coils, plugs and timers. Can be purchased entire or we will furnish any part as desired.

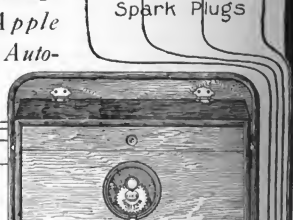


Storage Battery

The Apple Storage Battery. The only PORTABLE storage battery on the market, composed of lead bottle units, absolutely unbreakable. Can be used in connection with our Automatic Battery charger, or independently, as desired. Incomparably superior to dry cell batteries. Furnishes a fat hot spark that can't be surpassed for ignition purposes.

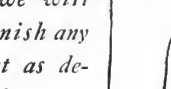


Timer



Coils

The Apple Automatic Battery Charger generates a steady strong, current sufficent to keep the batteries always full of juice. Our 1906 dynamo is the BEST DYNAMO MADE IN THE WORLD irrespective of size, or use for which intended. Uses electro-magnets electrically formed by currents generated by the dynamo itself. No so-called permanent magnets affected by vibration and heat as found in magnetos.



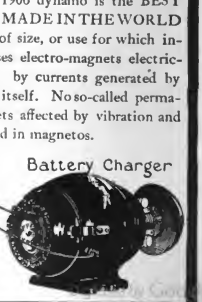
Automatic Cut Out

The Apple Automatic Cut-Out and Volt-Meter

When the engine is not running, it automatically cuts out the dynamo from the storage battery. The volt-meter indicates the voltage of the battery.

We manufacture coils, spark plugs, timers and everything used for ignition purposes. Specify an Apple outfit on your car. Increased satisfaction and saving on battery renewals will more than pay for the additional investment.

Battery Charger



Write to-day for full information about our system

THE DAYTON ELECTRICAL MFG. CO.

169 Beaver Building, Dayton, Ohio

WELCH

50 ACTUAL HORSE POWER

A combination of imported steels and "hand" workmanship with American simplicity of design and interchangeability, makes of the 1906 Welch a car equalled by none.

Buy a car whose vital points have been in use practically unchanged for several years, and that is being copied much more extensively by prominent makers than any other car in existence.

Buy one that is guaranteed to give better service the second season than the first, and that will not be a back number in six months through the caprice of the maker, a car that will carry you on the DIRECT drive from four to fifty miles, or better, per hour, and take ninety-five per cent. of all hills on the high gear. KNOW what you are buying. Ask for our treatise on Horse Power and our latest catalog.

WELCH MOTOR CAR COMPANY

WELCH-
Motor-Car-Co.
Detroit and
Pontiac Mich.



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Darracq



Coupe Limousine, 1906 Model
Particularly adapted to Winter use

Deeds, Not Words Sell the Darracq

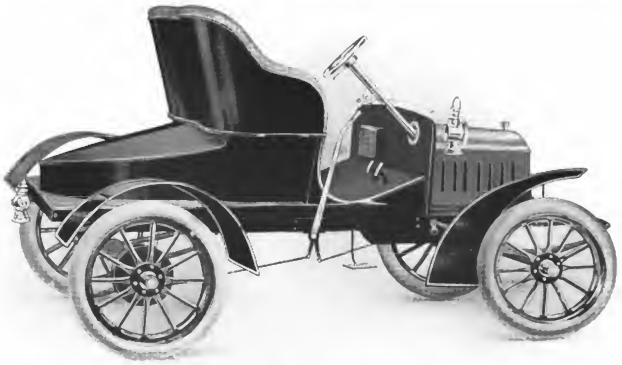
No car in the market can give such splendid proof of its superlative qualities. We can convince you by past performances and by present demonstrations that the Darracq car in its every detail stands to-day as absolutely the highest type of Automobile construction.

Victorious in the Vanderbilt Cup Race
Models from $5,000 to $9,000

Now in stock, ready for shipment, cars of 15-20 h.p., 24-28 h.p., 30-35 h.p. Any part of the Darracq replaced from stock within 24 hours.

American Darracq Automobile Co.
CONTROLLED BY F. A. LAROCHE COMPANY
652-664 Hudson Street 147 West 38th Street, New York
Licensed Importers Under Selden Patent (No $49,160)

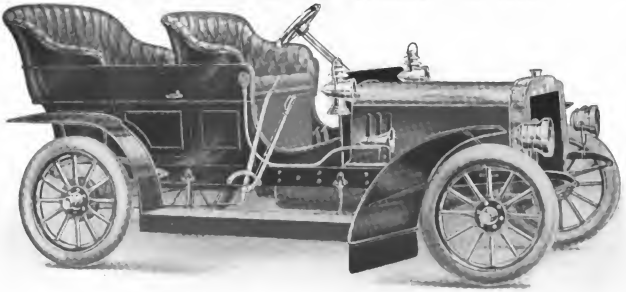
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The FORD 4-Cylinder Runabout

This car—Model N—is the biggest revelation yet made in Automobile construction. A car of this type for less than $500.00 seemed an impossibility, but here it is.

4-Cylinder—15 H. P. Direct Drive. Speed, 40 Miles. 78-inch Wheel Base. Weight, 700 Pounds.



FORD MODEL K

6 cylinders—40 H. P. 4 to 50 miles per hour on high gear. Perfected magneto ignition—mechanical oiler, 114-inch wheel base, luxurious body for 5 passengers, weight 2,000 pounds. Price, $2,500.00.

No further particulars will be given until these cars are shown for the first time at the Automobile Club of America's Show at the 69th Regiment Armory, New York, January 13th to 20th.

Deliveries for Models N and K will not be made before March.

1906 will be a "Ford Year." Agents who have closed with us can congratulate themselves.

FORD MOTOR CO. - Detroit

Members American Motor Car Manufacturers Association, Chicago

Branches—147-149-151-153 Columbus Avenue, Boston; 1743 Broadway, New York; 727 Main Street, Buffalo; Broad and Buttonwood Streets, Philadelphia; 1413 Michigan Avenue, Chicago; Cleveland and Kansas City.
Canadian Trade Supplied by Ford Motor Co., of Canada, Ltd., Walkerville, Ont.

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THE AUTOMOBILE EQUIPMENT CO

A Word to the Wise

REGARDING 1906 EQUIPMENT

WRITE EARLY FOR COMPLETE CATALOGUE OF

MOTOR CAR ACCESSORIES

We are pleased to add the names of interested motorists to our mailing list. For JANUARY we offer some very attractive prices to those buying early in the season.

NO MATTER WHAT YOU WANT
WRITE TO US—WE HAVE IT

TOPS! NOW IS THE TIME. *Get your orders in at once. See our samples of Top Materials. Get our quotations before ordering elsewhere.*

DOLLARS SAVED! *Fit, style, quality, finest workmanship guaranteed. We are ready for the 1906 Cars with complete line of our well-known specialties.*

CHAIN BOOTS, *invaluable for Chain Drive Cars.*

ENGINE CASES *or* **MUD APRONS,** *without such protection no car should be driven. Hundreds of these in use. Satisfaction warranted.*

Also, the most carefully chosen stock in America of everything pertaining to an Automobile or Gas Engine.

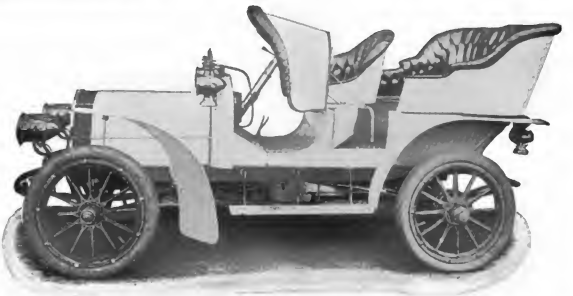
Do not fail to get our prices on Lamps, Horns, Plugs, Storage Batteries, Carburetors, Coils, Tires, Tire Covers, Tire Chains, Non-Freezing Mixture, etc., etc. You will find them right, and you will find the goods right. We are out for a big volume of business by mail order this year and we

Must Please our Customers

253 JEFFERSON AVENUE
DETROIT, MICH.

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The Engine Starts from the Seat by Forward Pressure on a Foot Lever. No Crank Necessary



THE 1906 DUQUESNE

SPECIFICATIONS:

16-21 H. P. 4 cylinder, 4 cycle vertical motor, air-cooled.

VALVES.—Intake and exhaust mechanically operated, interchangeable, Primary exhaust automatic.

IGNITION.—Jump spark. Dry batteries.

CARBURETOR.—Float feed, spray type, automatic, very efficient.

TRANSMISSION.—Planetary, all spur gears, running in oil.

SUSPENSION.—Three point flexible.

DRIVE SYSTEM.—Direct drive by band gears and Duquesne triangular system.

SPEED.—3—40 miles per hour.

STARTS from the seat with forward pressure on foot pedal.

BODY.—Double side entrance, seats five comfortably.

COLOR.—Optional.

WEIGHT—1,750 pounds.

BRAKES.—In addition to two powerful expanding brakes on rear wheels that suffice to hold the car anywhere, the rear wheel brake drum, on either side, is fitted with internal out ratchet teeth, that will positively hold the car on any hill, however steep. This is especially desirable in case of accident or should the motor stop for any cause, as it absolutely prevents car from running backwards.

CONTROL.—Spark and throttle lever are arranged on top of steering wheel, but independent of the latter. The gear operating lever is arranged immediately below the wheel; the backward movement of this lever gives the slow speed forward, the forward movement the high speed. The reverse and brakes are operated by foot pedals.

INTERCHANGEABILITY.—Every part that enters into the mechanism of the Duquesne is standard and interchangeable. This is a great convenience, especially regarding repairs. and we are in position to forward repair parts the day order is received—a little big thing.

Price 2,000, with full equipment. Two acetylene lamps, generator, oil side lamps, horn and tail lamp

Duquesne Construction Co.

JAMESTOWN, N. Y.

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UPTON

$2,500 $2,500



EXCLUSIVE AGENTS FOR NEW YORK

24-30 H.P., 4-cylinder, water-cooled, sliding-gear transmission, with D. W. F. ball bearings; 3 speeds forward and reverse; shaft drive; spark and throttle on sector within wheel, also foot accelerator; internal expanding metal clutch, allowing perfect smoothness in starting; wheel base, 109 inches; motor with extra large bearings and heavy nickel steel crank shaft.

BERLIET

LYON FRANCE



Model 40 H.P.

These cars are built in the following models: 22 H.P., 40 H.P. and 60 H.P. We will exhibit at Automobile Show, 69th Regt. Armory, Dec. 13th to 20th

Importers and Exclusive Agents for United States

MENDEL, DALE & CO.

219 WEST 58th STREET, NEW YORK

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MOTOR BUREAU

A Practical Plan for the Sale and Purchase of Second-Hand Cars

The buyer who waits till Spring before selecting a second-hand car is apt to find that he must wait, sometimes weeks, for his turn before his car can be received at a trustworthy shop for overhauling. When he gets the car back, he may find that the work has been hurried, and there are always some details, too miscellaneous to be put in the shop job, which must be attended to, before the car is in perfect order.

By purchasing in the early winter, the buyer has a chance to get acquainted with his car, and to have it overhauled under his own supervision before the spring rush begins. Liberal allowance for these always-essential preparatory steps will often mean the difference between a successful season and a disappointment.

MOTOR BUREAU assists sellers by listing their cars offered for sale. It assists buyers by sending them descriptions of all lined cars likely to meet their requirements. A fee of $1 is charged in either case, which in addition entitles the payer to a 20-word "want" or "for sale" advertisement in Motor.

Your car or your want is put on our list immediately upon receipt of your dollar. If you write us for a car, you will receive an immediate answer telling you what we have listed. If you wish to sell your car, typewritten copies of its specifications are made, and sent to prospective purchasers.

This plan eliminates the necessity of waiting several weeks for your advertisement to appear, and also seems to be the solution of the problem at present confronting automobile enthusiasts who have not the ready advantages of an up-to-date exchange house in their vicinity.

Buyers wishing cars inspected, tested, or overhauled under expert supervision are referred to Herbert L. Towle, consulting engineer of MOTOR BUREAU, who does this work at a fair rate for time spent. Mr. Towle's advice is given solely in the interest of the purchaser and is confined to used cars only.

Further particulars may be had by addressing MOTOR BUREAU, 1789 Broadway, or H. L. Towle, 150 Nassau St., New York City.

If you want to sell your Car

Fill out the coupon below and send it to us with $1, sent at our risk.

Fill out—Tear out—Mail to-day.

Motor Bureau,
1789 Broadway, New York City.

Enclosed find $1, for which please enter on your list the car described below. I understand that you will send additional charge give this car a 90 word "For Sale" advertisement in Motor, and also quote it to all prospective purchasers who are looking for a car of the following description:

Name of Car _____

Model or Date _____

H. P. _____ No. Cyl's _____

Askiog price _____

Extras _____

Remarks on condition, etc. (Make these as specific as possible)

If you want to buy a Car

State whether you want gasolene, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

Second-Hand Cars for Sale

Under this heading second-hand cars are advertised for sale at the rate of five cents a word, cash in advance. These columns are open to dealers as well as to owners of private cars. If you have a car for sale, you can reach more prospective purchasers by a "Motor Messenger" in Motor than through any other American medium.

1905 Royal Tourist Cars in excellent condition; all taken in trade for 1906 Royals; we have several of these cars for prompt delivery. C. A. Duerr & Co. (Incorporated), 1287 Broadway, New York City.

FOR SALE—Rambler Touring Car, single cylinder; all in A1 condition; price, $400; or will exchange for model B Cadillac runabout. Theo. F. Clark, Englishtown, N. J.

PANHARD, 15 H. P. Touring Car, 1903 model; new body; first-class condition; price, $1,200. The Auto Mart, 37th St. and 7th Ave., New York City.

THOMAS Single Cylinder Touring Car, seating five; sliding gear transmission; direct drive; very cheap. The Auto Mart, 37th St. and 7th Ave., New York City.

FOR SALE—Thomas, Model 18, tonneau; first-class condition; three new tires, Solar headlight, side and tail lights, horn, jack, extra casings, extra parts; cash, $350. Address Auto, 118 McGill Building, Washington, D. C.

FOR SALE cheap, a 1905 two-cylinder, 18 H. P. Northern, with stationery top and glass front; demonstration given. The Auto Mart, 37th St. and 7th Ave., New York City.

PEERLESS, built especially for me; guaranteed to go 50 miles an hour; two-passenger body, but can be equipped with a tonneau if desired. Model C, 1905 cyl.; would sell for $2,500. Address, C. Griswold, 43-49 Exchange Place, New York City.

WHITE; 1903 model; new engine and generator; car in perfect order; price, $700, or exchange for 1902 Franklin runabout. Room 306, 289 5th Ave., New York City.

WHITE Steamer; 1905 model; 15 H. P.; very best of condition; run only 2,500 miles; $400 worth of extras; will sell for $2,000. For further information apply to D. O. Black, Jr., Pawtucket, R. I.

AUTO car, thoroughly overhauled; like new; perfect condition; while in use gave me little or no trouble and had the best of care. For further particulars apply to H. A. Grant, Tarrytown, N. Y.

1900 THOMAS car in good condition; 40 H. P. Harry S. Hough, 233 Seventh Ave., New York City.

CADILLAC, model "B"; run only 3,000 miles; tonneau; three seats; extras; tools, etc.; overhauled this spring; condition first class; rock bottom price, $450. E. H. Davis, Evart, Mich.

BARGAIN.—1904 White Steamer, in first-class condition; looks like new, nearly; not much used; thoroughly reliable; buy the best. Alfred L. Wilson, 103 Miller Ave., Columbus, Ohio.

CONRAD make; best of condition; perfect motor; rides like a Pullman; no reflection at all; cost $1,050; will sell for $450; no time to use same. J. D. Greb, Ensley, Ala.

FOR SALE—Locomobile, 4 H. P. steam engine, A1 condition, price, $1,800. Locomobile, 12 H. P. burner, steel tube, $1; 14-inch Locomobile copper tube boiler, A1 condition, $50; 16-inch Locomobile copper tube boiler, $35; hand pumps, $2.50 each; Victor steam water pump, $150; Locomobile bevel differential gear, complete. At condition, $6; other Locomobile steam parts. North Ave. Auto Exchange, 1423 North Ave., Elizabeth, N. J.

OLDSMOBILE runabout, model 1903; top, extra seat, Cornet horn; very good condition; will sell for $300. Carle J. Bienner, 58 West 37th St., New York City.

OLDSMOBILE runabout; will sell for $300 or exchange. Write for particulars. C. J. Bienner, 58 West 37th St., New York City.

MITCHELL, Runabout, $750. Touring car, $1,500. Immediate delivery. Motor Vehicle Repair and Storage Co., 141-143 West 31st St., New York City, New York Distributors.

PACKARD FOR SALE. — Model L; four-cylinder; changed at the factory to a two-man car. Rear seats can be replaced if desired. Has shifting top and glass front; tire box back of rear seat; large carrying space back of seats; tires and everything in A1 condition. Address "Flyer," care of Motor, 1789 Broadway, New York City.

LOCOMOBILE 1904 model; in excellent condition; body painted green; will sell for $800. Automobile Arcade, 49th St. and Broadway, New York.

WHITE Steamer, Limousine, 1905, 15 H. P., 2 cyl. Tools, lamps, and Hartford Suspension, in good condition, and have overhauled by White Co. A. C. Keene, 128 Lexington Ave., New York City.

WINTON, Model B, with cape top, full set lamps, 1906 improvements, cost $3,000. Will sell for $1,800 cash. H. O. Keller, Reading, Pa.

FOR SALE.—Model B, Winton, canopy top, five lamps, 1906 improvements, cost $3,000, will take $1,800 cash. H. O. Keller, Reading, Pa.

FORD, 5 passenger, model C, used for demonstrations runabout; new, both cheap. Harrisburg Auto Co., Harrisburg, Pa.

MARION 1905 detachable tonneau touring car, cape top, just back from factory, 06 improvements, used 100 miles, repainted cheap. Harrisburg Auto Co., Harrisburg, Pa.

WHITE steamer, 1904 Model D. Used but little, in excellent condition; 12 to 20 H. P.; cost $2,000 without canvas. A. L. Wilson, 103 Miller Ave., Columbus, Ohio.

1904 POPE-TOLEDO, just been thoroughly overhauled and guaranteed to be in fine order; only $1,300. C. R. Armstrong, Lock Haven, Pa.

1905 ORIENT buckboard runabout; used less than one month, practically as good as new; with one extra new set; complete with tools, etc. N. Gray, Jr., Oswego, N. Y.

OLDSMOBILE, remodeled from 1903, 4 1-2 H. P., one cylinder; will sell for $200 cash and is a bargain. Has just been completely overhauled. J. S. Corbyons, 1246 Bedford Ave., Brooklyn, N. Y.

DURYEA Folding Rear Phaeton, 1905 model, perfect condition, $900. Leather top, two extra rear tires complete. 1205 Spruce St., Philadelphia, Pa.

FOR SALE.—40 H. P., up-to-date Thomas Flyer; practically new; two-passenger touring car; very best condition; a bargain. C. A. Coey & Co., 1293 Michigan Ave., Chicago.

FRANKLIN 1904, light tonneau car; painted red; Fisk tires; 1905 improvements; Rushmore lamps; color, royal blue and French gray. $800. Also Winton 1904 car, canopy top; 1905 improvements and in fine condition. $1,200. Lowe Supply Co., 22 Fourth St., New Bedford, Mass.

WINTON, 4 cyl., 20 H. P., model "C" Cape top; Bailey tread tires; condition perfect. $1,200. Franklin, model "D," 20 H. P., Cape top; run less than 1,000 miles; condition perfect, $2,000. Packard, 22 H. P., model "L," full lamp, hamper and top equipment; condition perfect, $2,000. Centaur Motor Co., Buffalo, N. Y.

CANADIAN automobilists, attention. I have a few good, second-hand cars for sale at very low prices. Write for list giving description and prices. L. D. Robertson, 5 Berthelet St., Montreal, Canada.

NORTHERN, 17 H. P., motor in front; Cape top; lamps complete; perfect condition, $1,300. Centaur Motor Co., Buffalo, N. Y.

FOR SALE.—Model B, Pope-Hartford; almost new; full lamps and equipment; tonneau; large Clincher tires; wide hood; first check for $452 takes it. T. B. Jenkins, Sumter, S. C.

1904 WINTON touring car; canopy top; glass front; Fisk tires in fine condition and extra tires and tubes. Paint and upholstery like new; machinery in absolutely perfect order. This car is powerful, speedy and quiet, and one of the finest Wintons in existence. Price, $1,100. Good reason for selling and will give thorough demonstration. A. P. Heyer, Bloomfield, N. J.

CLEVELAND runabout, with canopy top and glass front; G. and J. clincher tires. Just overhauled, having put on a new coil, Schebler carburetter, batteries, etc. In a very speedy machine, and in perfect condition. Yours for $275. J. E. Debbler, 1430 Michigan Ave., Chicago, Ill.

WE are offering some exceptional propositions in used cars; our cars demonstrators at sale. Haynes Auto Co., 1420 Michigan Ave., Chicago, Ill.

FOR SALE.—A $1,500 touring car for $700; double front wheel control engine, sliding transmission, double chain drive; carries five; color, red; tires, 30 x 3 1-2. Also one Orient Buckboard for $100, high grade. Also Fowler motor cycle, $50. Knight Auto Co., 211 North 12th St., St. Louis, Mo.

PREMIER, 4 cyl., side entrance body, demonstrating car, list $1,875, for $1,000. Cleveland for $1,800, used for demonstrating only; list price $2,800. The Dennett Bird Co., 1404 Michigan Ave., Chicago, Ill.

NO. 1. Two-cylinder Ford, 1904; new tires; transmission chain and spark coils; repainted and in fine condition. No. 2. Two-cylinder touring car, French motor, 3 speed sliding gear transmission; repainted and in A1 shape; new Dunlop tires, $300. Brumm Carriage Manufactory, Buffalo, N. Y.

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OLDSMOBILE, 1904; tires worn; new; speedometer; odometer; lamps and horn, $300. Stevens-Duryea, 4 cyl. demonstrating car; tires as good as new; car thoroughly overhauled and repaired; $2,000. Address, Brunns Carriage Co., Main and Summer Sts., Buffalo, N. Y.

CLEVELAND 24 H. P. side entrance car; victoria top; leather top; extra shoe and tubes, Rushmore lights, cost, $3,200, sell for $1,600 if taken at once. Gotham, 1655 Broadway, New York City.

WAYNE 20 H. P. touring car, in perfect condition; 6 lamps, $900, guaranteed. Jas. Lehan, Stoughton, Mass.

WINTON 1903, first class condition; write if interested for full particulars. Auto Storage and Trading Co., Albany, N. Y.

OLDSMOBILE runabout, 1906 model; brand-new; new extra tire, $65. Reason for selling, am getting larger car. Arthur Diesel, Huntington, N. Y.

JACKSON, 20 H. P., 1905, side entrance car for sale; condition perfect, $900. New car worth $150, top; used for show only, $1,000. Jackson, 1655 Broadway, New York City.

WINTON model B, 1901; extra tire and gas lamps; in first class shape. Krieger Co., Lima, Wis.

HAYNES-APPERSON 1904, 14-16 H. P., 3 cyl., fully equipped; three lamps; extra parts; top fine leather; side curtains; storm apron; used very little, and is practically as good as new, with exception of tires, $850. Dr. Wm. M. Stith, Petersburg, Va.

OLDSMOBILE light touring, run 3 months, like new; will trade if interested. Also a new 2 cyl. 24 H. P. Locomobile; rear entrance; list, $1,000, bargain at $3,000. Automobile Storage and Trading Co., Albany, N. Y.

AUTOMOBILE BARGAINS

We are the LARGEST dealers of new and second-hand automobiles in the United States. Complete bargain sheets sent upon request. We name below a few of our bargains. No matter what YOU are looking for, YOU are sure to find it at our place. If YOU are coming to New York to the Automobile Show, do not forget WE are the people.

No. 1811 GROUT steam delivery wagon, $250.00. A rare bargain.

No. 2000—Model "F" CADILLAC, almost new, $575.00.

No. 2001—2 cylinder AUTOCAR, direct drive, engine under the hood, all late improvements, $850.00.

No. 2002—Brand new 1905 2 cylinder AUTOCAR, $950.00.

No. 2004—7 cylinder engine under the hood, KENSINGTON tonneau, one of the most powerful machines built. A rare bargain, $500.00. Nothing better made for the last price, $1600.00.

No. 2003—1904 CADILLAC, tires like new, in the finest of condition, $375.00.

No. 2006—Model "A" CADILLAC in good running order, $300.00.

No. 2007—1904 model "D" LOCOMOBILE in absolutely perfect condition, 1350.00.

No. 2009—1903 2 cylinder POPE-HARTFORD with top, full equipment of lamps. Side entrance machine, $850.00.

No. 2010—Model "D" CADILLAC, paint good, machine in fine running order, $450.00.

No. 2013—1904 OLDSMOBILE touring car, been thoroughly overhauled, in A1 order, running order, $450.00.

No. 2014—1903 model "C" WINTON, never been run more than 500 miles, with a folding top, Rushmore lamps, everything up to date, like new, price $1100.00

No. 2015—1904 CLEVELAND, will seat 5, fine Cape Cart Top, not run 150 miles for demonstrating purposes, cost $900.00. Our price $500.00.

No. 2016—1904 POPE-TOLEDO, thoroughly overhauled at the factory, in fine condition, $1400.00. 24-30 H. p.

No. 2020—1904 WINTON touring car with canopy top and glass front, guaranteed in first-class condition, $800.00.

No. 2021—1905 WINTON in perfect running order, 20 h. p., will seat 5 or 7. More for the money than any other machine. $500.00.

No. 2022—DE DION motorette, will seat 4, imported machine. A bargain at $175.00.

No 2023—KNOX runabout with fine folding leather top, no better machine for a doctor. In absolutely perfect condition, cost $1450.00. Our price $500.00.

No. 2025—4 cylinder FRANKLIN runabout, guaranteed in fine condition, price $500.00. We will sell you a tonneau to fit this machine for $50.00 extra.

No. 2026—1904 WHITE steamer, been thoroughly overhauled by the makers, guaranteed in fine running order, $800.00.

No. 2027—1903 WAYNE touring car, 24 h.p., double opposed engine, in the finest of condition. Tonneau never been used. Machine cost $1250.-00. Our price $650.00.

No. 2028—1905 AUTOCAR runabout in perfect condition, looks like new, price $800.00.

No. 2029—1903 S. C. K. W. L. runabout, newly painted, new tires, good as new, price $500.00.

No. 2030—Model "A" WINTON, 1905, with fine folding leather top, Hartford suspensions, Newsrout gas lamps, Prest-o-lite gas tank, Cape Cart Top. Peterson oil feed Machine cannot be told from new. All new trend tires. Machine cost $4,000.00. Guaranteed as like a minute. Price $2000.00. One of the biggest bargains today on the market.

No. 2031—1903 FRANKLIN, been thoroughly overhauled, newly painted, like new. New tread tires, side entrance machine. Price $850.00.

These are only a FEW of our NUMEROUS bargains. We have over 200 others on our floors ready for demonstrating. Every Machine demonstrated without any obligation to yourself. If you find anything specified above that is interesting to you. we would advise that you telegraph us the particular number, and we will hold it awaiting further communication from you, or your remittance. You must take into consideration that second-hand automobiles are not like other merchandise, for what we have to-day may be gone to-morrow.

Times Square Automobile Co.
164 West 46th Street
7 doors East of Broadway
New York City.

FOR SALE, 1905 Franklin runabout, in excellent condition and in actual use about six months, equipped with the acetylene lights and gas tank. Address, 942 West 5th St., Cincinnati, Ohio.

ORIENT buckboard, in first-class shape; price, $150. Lorain Auto Co., Lorain, Ohio.

OLDS tonneau, $450; four cylinder air-cooled Marion, $650. A. L. Dyke, St. Louis, Mo.

NORTHERN touring car, 1904; in good shape. C. E. Hamm, Cadillac, Mich.

OLDSMOBILE touring runabout, new, $550; touring runabout, used 300 miles, $500. Wichita Auto Co., Wichita, Kan.

THE NEW YORK SHOW

will soon be open; prospective purchasers can secure the advice and co-operation of an expert of many years' experience in all branches of the industry, but impartial, because not associated with any manufacturer or dealer; those interesting in the imported cars can be especially aided and benefited.

Address, E. C. Room 81,
140 West 42d St.,
New York City.

Tel. 540 Bryant.

WILL sacrifice 1905 model Queen touring, 18-H. P. double-opposed motor, perfect condition, $450. Lomas, 715 Monroe St., Chicago.

ORIENT touring car for sale at a sacrifice; four-cylinder, 25 horse power, 30 H. P. rated by June; been used three months. Address, "Orient," care of Motor.

FRANKLIN, light tonneau, 1904, 10-H.P., 4-cylinder; in perfect order; has been run but seven months; am buying larger car; will sell for $800. Dr. Wm. Jarvis, 105 Clinton St., Brooklyn, N. Y.

ONE 40 and one 50-H. P. 1905 up-to-date Thomas Flyers; have had the best of care and are as good as new; each equipped with extension top, glass front, six lamps, including 8-inch swivel searchlight, Prest-o-lite tank and Jones speedometer; speak quick. Barclay Auto Company, 248-50 3d Ave. South, Minneapolis, Minn.

KNOX Surrey, 2-cylinder; fine shape; perfect running order; it will pay to get price. Knox, care of Motor.

FOR SALE.—Waverley electric Surrey; brand new exide (air battery) cells; run but little; new; $650. Charles Bile, 1428 Court Place, Denver, Col.

STANHOPE, electric; first-class condition; write for description; a bargain. Electric, care of Motor.

PACKARD, 4-cylinder, model L; tires, bearings, finish, etc., first class; current running; will be sold at a great bargain. Packard, care of Motor.

WAYNE, 1904, 16 H. P., 2 cyl., tools, searchlight; Continental tires in very good condition, $700. Carl Valentine, Dunkirk, N. Y.

ORIENT Buckboard Surrey for sale. Car carries four, is in fine condition and will be sold cheaply. F. E. Murray, Farmington, Me.

CRESTMOBILE, run less than 300 miles, 1905 model D; as practically new. Address, B. F. Gollmar, Baraboo, Wis.

CADILLAC, model E, runabout; new; with top, $600; also 1905 touring car, 5-6, with top, $1,000. W. F. Anderson, Nashville, Tenn.

FOR SALE.—One model F Cadillac tonneau, used for demonstrating only, and is as good as new. One model C Knox runabout. If you are thinking of buying a car for the new year it will pay you to correspond with me. Dunbar Mausser, Holyoke, Mass.

A NEW YEAR OFFERING—Ford Model B, 1905, 4 cyl. 24 H. P. at a bargain. F. C. Griffiths, Broadway and 49th St., New York City.

ORIENT BUCKBOARD, 1904—Only run 100 miles. Tires have not been punctured; will bear inspection; come and see it; will sell for $250 if taken at once. J. A. Renie, Edinburgh, Indiana.

OLDSMOBILES, $225, $250; Haynes-Apperson, $200; Ford, $200; St. Louis, $300, $500; Buick, $650; Jackson, $600; Cameron, $1500. Hagmann & Hammell, Chicago, Ill.

LADIES AND GENTLEMEN—A Thomas flyer, 1904 model, for sale. Call at 49th St. and Broadway. Write for full particulars and oddge. F. C. Griffiths, 49th St. and Broadway, N. Y. City.

CADILLAC model F 1905, $700; only slightly used; as good as new; good reasons for selling. Address, Philip N. Pitcher, Barrytown, N. Y.

SPEEDWAY 4 cyl., side entrance, 24 H. P.; a beauty; tonneau and New York's newest almost. F. C. Griffiths, 49th St. and Broadway, New York City.

OLDS runabout, late model; like new; not driven 100 miles; no use for it; price low. Runabout, care of Motor.

SEARCHMONT, 1904, 18-20 H. P., 2-cylinder; in good condition; tools, lamps, horn, baskets, etc.; will give thorough demonstration; room for 5. For further particulars address, H. H. Hasker, 238 West 50th St., New York City.

RAMBLER, model 4, 16 H. P.; canopy top, side baskets; oil and gas lamps; will sell very cheap. W. E. Rudy, Lima, Ohio.

OLDSMOBILE runabout; engine, transmission; all machinery rebuilt; guaranteed wood wheels, finish and tires; good condition; $225. Detroit Oldsmobile Co., Detroit.

OLDSMOBILE, 1904; tires worn; new; speedometer; odometer; lamps and horn, $300. Stevens-Duryea, 4 cyl. demonstrating car; tires as good as new; car thoroughly overhauled and repaired; $2,000. Address, Brunns Carriage Co., Main and Sumner Sts., Buffalo, N. Y.

CLEVELAND 24 H. P. side entrance car; victoria top; leather top; extra shoe and tubes, Rushmore lights, cost, $3,200, sell for $1,600 if taken at once. Gotham, 1655 Broadway, New York City.

WAYNE 20 H. P. touring car, in perfect condition; 6 lamps, $900, guaranteed. Jas. Lehan, Stoughton, Mass.

WINTON 1903, first class condition; write if interested for full particulars. Auto Storage and Trading Co., Albany, N. Y.

OLDSMOBILE runabout, 1906 model; brand-new; new extra tire, $65. Reason for selling, am getting larger car. Arthur Diesel, Huntington, N. Y.

JACKSON, 20 H. P., 1905, side entrance car for sale; condition perfect, $900. New car worth $150, top; used for show only, $1,000. Jackson, 1655 Broadway, New York City.

WINTON model B, 1901; extra tire and gas lamps; in first class shape. Krieger Co., Lima, Wis.

HAYNES-APPERSON 1904, 14-16 H. P., 3 cyl., fully equipped; three lamps; extra parts; top fine leather; side curtains; storm apron; used very little, and is practically as good as new, with exception of tires, $350. Dr. Wm. M. Stith, Petersburg, Va.

OLDSMOBILE light tonneau, run 3 months, like new; will trade if interested. Also a new 2 cyl. 24 H. P. Locomobile; rear entrance; list, $1,000, bargain at $3,000. Automobile Storage and Trading Co., Albany, N. Y.

AUTOMOBILES
At Prices Within Reach of All

With over 250 automobiles on hand, every inch of room crowded, and a keen desire to sell, we offer prices within the reach of all.

$150 to $500

Loco Runabout $150; Mobile Runabout, good as new, $175; Mobile dos-o-dos, good as new, $275; Centrifle Runabout, $225; Ford Touring, Runabout $275; White Steam Stanhope, with top, $350; Rambler Runabout $200; Long Distance Runabout, 7-passenger, $275; Ford Tonneau, 2-cylinder, $425; Yale Tonneau, 2-cylinder, $450; Franklin Runabout, 4-cylinder, $500. Over 100 others

$600 to $2,500

Packard Tonneau, canopy top, $600; Prescott Steamer, with top, $625; Pope-Hartford Tonneau $650; Loco Touring Car, 2-cylinder, $675; Auto Car Tonneau, canopy top, $725; White Steam Tonneau, $750. Decauville Tonneau, canopy top, $1,000, Columbia Tonneau, 4-cylinder, $1,600; Mercedes Tonneau, 4-cylinder, $1,800. Over 100 others. Write for list. We have what you want at almost your own price.

Manhattan Storage Co.
Largest Auto Dealers in the World
334-340 West 44th St., New York City
Two Blocks from and St. Station 9th Ave. "L"
Three Blocks from Broadway.

FOR SALE.—Standard Oldsmobile runabout, with rear seat; traveling box; storm apron, and horn; purchased in June, 1905. Cost $1,000. Will sell for $500 takes it. In fine condition. Hamlin Barnes, Wellsville, Ohio.

A NUMBER of imported and American 4 cyl. cars, including DeDietrich, C. G. V., Clement, Cleveland, Stevens, Duryea, &c. Gotham, 1655 Broadway, New York City.

FOR SALE.—Quick returns; two Surreys, type 1, Rambler, used as demonstrators; first class condition, $800 each. One model F, Ford, used as demonstrator. At condition, $750. One 1904 Knox, good condition, canopy top; repainted; original cost, $1,350; price now, $450. One model B, Ford, runabout with top, in good condition, $225. One model E Rambler runabout, in good condition, $250. One 1904 Olds runabout in good condition, $250. Further particulars by mail. Richmond Jarvis Co., Grand Rapids, Mich.

WHITE STANHOPE, nearly new, latest model, with condenser and encased engine; runabout has not been run more than 500 miles; would consider a trade or sell for cash, $650; also White steam delivery wagon, brand new; first check over $1,500 takes them both, or will trade for new touring car. Chas. Bile, 1428 Court Place, Denver, Col.

MOTORCYCLE SNAPS—"Thor," "Curtiss" and "Merkel," new machines at a discount; used for demonstration, perfect in condition and appearance; second-hand "Indian," $100; Mitchel racer, $125; Thomas autobi, $100; other bargains; "Thor," also "Curtiss," side cars a specialty, air-cooled engines, castings and motorcycle accessories. To secure best bargains write quickly to Whipple, The Motorcycle Man, 260 West Jackson Boulevard, Chicago, Ill.

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LOCO runabout, equal to White, $450; two late buck-board bargains, better than stock machines, cheap for cash. V. Berg, Lemars, Iowa.

NINETEEN-FOUR Stevens-Duryea runabout; top, lamps, headlight, extra tubes, tires, tools; $750. C. D. Snow, 10 Ringgold St., Providence, R. I.

FOR SALE, steam auto; first-class condition; will go anywhere; best offer taken it. W. L. Ely, Fredericktown, Ohio.

MODEL B tonneau Cadillac; good condition; lamps, clock, extra tubes, tools; $350. C. D. S., 11 Walnut St., Providence, R. I.

ONE 10-passenger steam wagonette for sale at a bargain. A. F. Dodd, Griffins Corner, N. Y.

RAMBLER 1905, top, glass front, Rushmore lamps, oil lamps, speedometer, tools, tubes; $850 buys it. Wm. Schloss, Providence, R. I.

CADILLAC 1905 model F; in A1 condition; just overhauled. Box 538, Rockville, Conn.

FRANKLIN 1903 40 H. P.; largest bargain ever offered; winter or summer car; Franklin agents wake up; $1,150. Amos Pierre, 109 South State St., Syracuse, N. Y.

1904 4-cylinder Stevens-Duryea; top, 5 lamps, Jones speedometer, clock, basket, storage battery, tubes and tools; excellent condition; owner has ordered 1906 car; price, $2,200; cost complete, $2,800. C. D. Snow, 10 Ringgold St., Providence, R. I.

POPE-HARTFORD 1904, with 1905 two-cylinder Buick engine; in good condition; tires almost new; big bargain, at $600. Park, 1432 Olive St., St. Louis, Mo.

AUTO CAR, 1905, four-cylinder, four lamps; in good condition; used for demonstrating; cost $2,100; will sell for $1,400. Park Automobile Company, 1432 Olive St., St. Louis, Mo.

PACKARD 1903 Model F, 12-H. P., one cylinder; many extras; car completely overhauled at factory last winter and not driven since; will equip with new tires if sold. Price, $750. H. W. Beach, Montrose, Pa.

GLIDE, 1905, with tonneau, G. & J. tires; never punctured; has been run very little; looks like new. Box 664, Crookston, Minn.

THOMAS 1905, 40-H. P., in perfect condition; run 3,000 miles; tires in good condition; extension top; owner has ordered 1906 model Thomas; cost $2,300; sell for $1,200. P. A. C., 1432 Olive St., St. Louis, Mo.

SPECIAL BARGAINS IN CADILLAC CARS

These second cars have been thoroughly repaired in our own repair shops, and the machinery is practically as good as new. Every car guaranteed as represented. No used cars sold before being thoroughly overhauled.

One Model A Cadillac, 1903 hood and radiator, dark green body, red running gear; fine little car; $385.

One Model F Cadillac, complete with lamps, horn and searchlight; $700.

One Model D Cadillac, four cylinders, full equipment, including top; a splendid bargain for an early purchaser; $2,150.

Call and see these bargains soon if you are in the market. Cadillac Company of New York, 151 West Thirty-eighth St., New York City.

PACKARD FOR SALE

1905 machine, little used; has regular open Packard body, also handsome coupe body made by Rothschild, of Paris. Everything in good order.

Address, "TWO BODIES"
Care of MOTOR

FOR SALE, VERY CHEAP, Ford 4-cylinder; Ford, 2-cylinder; Winton 2-cylinder; Rambler 2-cylinder; imported Rambler E, 2-cylinder; Orient Buckboard; most-ly 1905 cars; prices and descriptions extremely interesting; a card will bring the information. E. S. Youse, Reading, Pa.

CADILLAC, Model B, tonneau; first-class condition; lamps, side baskets, horn, extra tire; price, $450. W. E. Gray, Williamsport, Pa.

FOR SALE.

IMPORTED MERCEDES CAR.

In perfect condition. Almost new. 188-25 horse-power. Seats four. Landaulet. Tools, lamps, etc. Owner going abroad.

Car cost over $10,000.
Sell reasonable price.

C. J. Ross,
289 Fourth avenue, N. Y.

Second-Hand Cars Wanted

Under this heading tests of second-hand cars for cash or exchange are inserted at the rate of five cents a word. Since Motor is read by all dealers in second-hand cars as well as by more private car owners than any other motoring paper, a "Motor Messenger" in this column is more certain to obtain for you just the car you want than any other kind of advertising.

WANTED.—Two or three Thomas cars or Packards; rigged for sixteen seats for omnibus purposes; must have solid tires and fifteen to eighteen miles speed. Danville Ice and Coal Co., Danville, Ky.

WANTED.—A second-hand, four-cylinder, 1905 Great Arrow car in good condition. G. A. Singer, Carbondale, Pa.

WANTED.—For cash; a second-hand, four-cylinder, 1905 touring car; must be in good condition. Address, with full particulars, Lock Box 17, Rising Sun, Ohio.

WANTED.—To purchase a 1905 model Auto-Landaulet Mobile; must be in good shape; $2,000 might rent it. Wm. C. Osborn, Empire Building, 71 Broadway, New York.

WANTED a four-cylinder touring car; must be in good condition. W. Henry, P. O. Box 1049, Ottawa, Canada.

WANTED.—1904 Winton; fine condition; send full description and lowest cash price in first letter. Wichita Auto Co., Wichita, Kan.

WANTED.—18 or 24 H. P. Panhard 1904 or 1905 model, in good condition; not particular as to appearance; will pay spot cash for the right car. Address, C. T. B., 470 East 17th St., Brooklyn, N. Y.

I AM in the market for a second-hand runabout. Would prefer 1 cyl. or 8ex. Ford, Cadillac or Mitchell, 1905 model. Geo. R. Koehler, Newburgh, N. Y.

WANTED.—28-32 Pierce Arrow, 1905 model; will buy touring car if in good condition. A. P. Heyer, Bloomfield, N. J.

I WANT an A1 touring car, gasoline, about 30 H. P., four-cylinder, 1905 model, standard make. W. G. Welles, Nocatee, Fla.

Situations Wanted

Chauffeurs desiring positions can do no better than to let the fact be known in "Motor Messenger" in this column at the rate of five cents a word.

ACCOUNTANT, cashier and office manager, with a fine record for ability and integrity of nearly 20 years behind him, desires a change; is anxious for position of responsibility with an automobile firm. Address M. W. E., Box 16, care of Motor.

AUTOMOBILE owners desiring experienced men will be supplied with a selected list and full information by sending $1 to the Chauffeurs' Registration Bureau, 1789 Broadway, New York City.

CHAUFFEUR wants position; colored; understands gasoline cars; licensed and references; city or country. Address J. Friar, 240 West 61st St., New York City.

CHAUFFEUR, first-class man, understands repairing, wishes permanent position; well recommended; good references. Address P. Loccia, 1431 5th Ave., New York City.

FOUR years' road experience; drives and repairs any car; machinist by trade; present employed, but wishes to improve his position; best references. Address Y. B., care of Bayonne, 5 East 135th St., New York City.

GERMAN, five years on gasolene cars, wishes position in New York or New Jersey; good references; $25 per week. Wm. Kaspe, 138 Wallabout St., Brooklyn.

JAP.; aged 25; eight months' experience on gasolene cars; will go anywhere as a chauffeur; good references; strictly sober and honest; want $20 without board, $15 with board. Address Mr. W. G., 64 East 133d St., New York City.

EXPERIENCED factory manager and superintendent of automobile factory is open for engagement; if you want a man that gets results will be pleased to "deliver the goods." Address "Energy," care of Motor.

CHAUFFEUR and machinist; five years' experience on foreign and domestic cars; wants a position in private family; wages, $75. G. Gelber, 4 East Sixty-seventh St., New York City.

YOUNG Swiss; in this country but one month; served in London five years; the best of references; speaks French and English; wants position at almost any salary. Edouard Mangl, 142 West 25th St., New York City.

EXPERIENCED chauffeur on gasoline or steam cars wishes position anywhere; preferably with private family; wages, $25. W. S. Dietrich, 54 Ward St., Waterbury, Conn.

CHAUFFEUR, experienced in every branch of the work, wants position to run a gasoline car; foreign or American; good references. George J. Brush, 747 Third Ave., New York City.

YOUNG American, 30 years old, with four years' shop and road experience; also vears' good experiences; wants a position anywhere at $20 per month. Address C. L. Atkins, 847 Columbus Ave., New York City.

GERMAN; just left auto school, wishes position anywhere; will come for $80 per month to start; am not married, good references. Richard Loks, 257 Montgomery St., Jersey City, N. J.

CHAUFFEUR with experience of four years enables me to run any make of gasoline car; wages, $20.50; will go anywhere. F. Klahn, care of J. F. Johnson, P. O. Box 511, Orlando, Fla.

CHAUFFEUR; 25; licensed; desires situation with private family or in a shop; anywhere; good references. Address E. Leuthner, 315 Central Ave., Jersey City, N. J.

CHAUFFEUR, strictly temperate, speaking German and English; four years' experience with private cars; machinist by trade; first-class private and garage references. W. W. Winkler, 615 Columbus Ave., New York City.

FRENCHMAN; two years' experience on Peerless, Mercedes and Panhard cars; others; wants position; wages, $75; single. Address M. Seiger, 19 East Third St., New York City.

CHAUFFEUR. — Experienced in every branch of the work, wants a position to run a gasoline car; lots of experience; best of references. H. A. W., Box 6, care of Motor.

ENERGETIC young man of good address, technical education and practical experience, at present in designing room of large company, wishes good opening in selling department of responsible automobile manufacturer or agency; thoroughly familiar with same; is licensed driver and in earnest. Address "Steel," care of Motor.

YOUNG man, 17 years as machine repair man, wishes to position outdoors; am now getting $21 a week; good reference and fair information upon request. Wm. H. Petrie, 605 E. Main St., Little Falls, N. Y.

GERMAN, 32 years old, married, wishes position as chauffeur; salary, $80; city or country. Wilhelm Rose, 1 Lexington Ave., New York City.

IRISHMAN, experienced on gasolene cars, wants position. Michael Sullivan, 227 East 111th St., New York City.

YOUNG man, 28, would like position in shop where he can learn how to run and repair cars. Wages no object. Will go anywhere. John Stevick, 436 West 39th St., New York City.

CHAUFFEUR, licensed, thoroughly reliable, well recommended, can run and repair any make gasolene car, shop and road experience, city or country; salary moderate. Dusenbury, 372 Bedford Ave., Brooklyn, N. Y.

LICENSED chauffeur, experience in shop and on the road; can run all gasolene cars; two years in last place. Thomas J. Donovan, 206 West 41st St., New York City.

WANTED.—Position in Florida or any other winter resort, as demonstrating, chauffeur or mechanic; 7 years' experience on all kinds of gasolene engines; first class references as to ability and character. Chas. Wooster, Westhampton Beach, L. I., N. Y.

Professional Chauffeurs' Club of America
(INCORPORATED)

If you are in need of a competent Chauffeur, kindly notify us by mail or 'phone, and we will gladly supply same without charge to either party.

'Phone 2498 Columbus — **1775 Broadway, New York City**

A MERICAN, 21 years of age, six months' experience on road and in shop, wishes position with private party or business house anywhere; gasoline and electric machines. F. J. Diskin, 642 Tenth Ave., New York City.

LICENSED chauffeur, with best of references from last employer, desires position with private family; willing to leave city. E. Rudiger, 232 East 26th St., New York City.

SALESMAN, with excellent practical knowledge of motor-car mechanism, wants position; good references from first-class firm. Address "Salesman," care of Motor.

Help Wanted

Since all the best chauffeurs are regular readers of Motor, a "Motor Messenger" at five cents a word is the surest means of obtaining a satisfactory chauffeur.

THE CHAUFFEURS' REGISTRATION BUREAU offers the only opportunity by which experienced chauffeurs are placed in communication with automobile owners; registration fee $1, including advertisement in Motor; no further charge; send stamp for registration blank and further information to CHAUFFEURS' REGISTRATION BUREAU, 1789 Broadway, New York City.

ON demande un chauffeur français pour l'automobile Léon Bolée. Responder en français. Ecrire A. O. Bolte 14, bureau du journal.

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IF chauffeurs want insurance, and they all ought to have it for the sake of their families and those dependent upon them, let them apply to one of the agents of one of the smaller companies who do not rob them of their savings, but gives them safe and sure insurance. Apply to the Security Mutual Life Insurance Company, 41 Park Row, New York.

WANTED.—Competent men as instructors in progressive automobile school; must be prepared to take examination in theory and practice; permanent positions. Instructor, care Motor.

Cars for Rent

Under this heading advertisements of motor cars and motor boats for hire are inserted at the rate of fifte cents a word. A chauffeur seeking a car for rent should keep a "Motor Messenger" running in this column. Motor is the only motoring paper published that has any large circulation among that portion of the general public that does not own motor cars.

BOUTON MOTOR COMPANY.
AUTOMOBILE rental service; four-cylinder touring cars exclusively; garage and salesroom. M. D. Bouton, president; Frederick A. Tanner, treasurer; James H. Scott, superintendent. Phone 4052 38th St. Address 110 West 41st St., New York City.

TOURING CAR FOR RENT.—Large private car by the hour, day or trip. James L. Magee, 1401 Broadway, Times Square, New York. 'Phone 1724 38th St.

AUTOS FOR RENT.—Day, hour or trip. M. J. Vosie, 134 West 43d St., New York, or 'Phone 6782 38th St.

FOR RENT.—Fine new Jackson cars. The Jackson Agency, 143 West 39th St., New York.

THE swellest autos to hire in New York are the new four-cylinder Packard touring cars. Private tours anywhere. I cater to the select trade of New York. F. Lauterbach, 1488 Broadway. 'Phone 2668 38th St., New York City.

Motor Car Supplies and Accessories

Under this heading are advertised, at the rate of fifte cents a word, all kinds of motor supplies, parts and accessories. Motor is more widely read by car owners than any other motoring paper, and is therefore the best medium in which to advertise motor car supplies.

IF you are having trouble with your radiator, write for our circular describing the very best cooler made; quick delivery. Fedders Manufacturing Works, Buffalo, N. Y.

HONEYCOMB radiators, mud guards, hoods, tanks, aluminum brazing, sprocket covers, repairing of all kinds. A-Z Co., 452 Eleventh Ave., New York. Call or phone 2194 38th St.

FOR SALE.—Two Swinehart tires almost new, 32½ x 3½. $20 each; one new polished brass lamp, one new glass front, large canopy top, $65. George Auto Co., George, Iowa.

SHEET METAL SUPPLIES. Specialties. Fedders Manufacturing Works, Buffalo, N. Y.

STORAGE and repairing of all descriptions; best equipped station in Eastern New York. Utica Auto Station; W. F. Polson, proprietor; 22 West Utica St., corner of Main, Buffalo, N. Y.

W. M. SHARPE.
VULCANIZING; all makes of tires and rubber goods repaired; auto tires recovered; old tires bought. 118 West Broadway, New York City.

AUTO TIRES AT HALF PRICE.
WRITE TODAY.
A. H. KASNER,
152 Church St. — New York.

PROTECT YOUR AUTOMOBILE WITH A MUD APRON. A-Z Co., 460 Eleventh Ave., New York, N. Y. Call or 'phone 2194 38th St. Send postal for blotter giving full information.

FOR SALE.—White Flash boilers, complete with regulator and thermostat, $60 each; 14 and 16-inch Loco and Tonkins boilers, good as ever, having been replaced by our Stickney Safety Steam Generators. One 14-inch Barrett Universe burner, nearly new, $25. One 14-inch burnt boilers $15 apiece. Portland Garage, Portland, Me.

AN anti-freezing solution that will circulate and is harmless to metals, we have perfected after years of experience. This solution will stand the coldest weather and is reliable. Price, 65 cents per gallon. Hagmann & Hummell, Chicago, Ill.

FOR SALE.—A job lot; Bougie Hero plugs, $1.00 each; E. C. Bougie plugs, 50c. each; E. C. Mica plugs, 60c. each; Sta-Rites plugs, 75c. each; Never-Miss plugs, 75c. each; Jim De Dion Coyle, 50c. each; Jim De Dion Mica Cores, 50c. each; Dow Mica plugs, 65c. each; Jewel plugs, 50c. each; battery terminals, 25c. each. A. M. Somers, 901 N. Fairfield Ave., Chicago, Ill.

FOR SALE.—Nickel-plating outfit, 120 ampere dynamo, nickel anodes, vats, polishing stand and wheels, all complete, cheap. R. S. Pritchard, Portsmouth, Ohio.

MANHATTAN BRAZING WORKS.
CAST IRON BRAZING. We make a specialty of brazing cylinders, gears and machinery of every description, and all other metals. WE ABSOLUTELY GUARANTEE THE WORK WE DO. 112 Reade St., cor. West Broadway, New York. Tel. 3010 Franklin.

ROAD MAPS
Of New York, New Jersey and New England by districts; all roads and points of interest shown; automobile routes colored red; catalogue free. Geo. H. Walker & Co., 221 High St., Boston, Mass.

LOOK HERE.
IF you want a good 2d-hand auto tire, I carry the best, and have the largest stock in New York. All sizes at prices that will interest you. VULCANIZING. All makes and sizes of tires repaired. Work guaranteed. GUARANTEE EVERY REPAIR. Write for repair price list. W. M. SHARPE, 118 West Broadway, near Duane St., New York City.

For Exchange

A new Department sure to produce results. Every motorist has surplus accessories. Exchange them for something useful. Fifte cents a word.

WILL exchange for a good steam commercial wagon a passenger truck or car; a Conrad; best of condition; many extras. For further particulars address J. D. Grch, Ensley, Ala.

WANTED TO EXCHANGE, new canopy top Surrey for 4-in. gasoline. Address W. W. Embly & Co., Asbury Park, N. J.

CANOPY top, glass front for runabout; also tonneau top, forks, wires and tonneau for Franklin; make an offer. B. F. Conner, 56 Beekman St., New York City.

EXCHANGE.—Advance, 16 H. P. steam threshing outfit; complete and in good order; want a steam or gasoline touring car. Frank E. Gates, Orleans, Neb.

CRESTMOBILE, 8½ H. P.; air-cooled shaft drive; has not been run 500 miles; perfect condition; price, $450, or would trade for a good side entrance car and pay the difference. Lock Box 907, Fredericktown, Ohio.

WANTED.—An automobile exchanging for a nickel-in-the-slot electric piano, or sax howling alleys. Prefer a Haynes, but will consider any car equally as good. J. B. Deibler, 1420 Michigan Ave., Chicago, Ill.

WANTED.—Automobile in exchange for due bill on Story & Clark Piano. J. B. D., 1420 Michigan Ave., Chicago, Ill.

Instruction

Under this heading are inserted, at the rate of fifte cents a word, the names of reputable and correspondence automobile and motor boat schools, as well as notices of motoring books and other publications.

MANHATTAN AUTOMOBILE SCHOOL.—Instruction by experienced teachers who are mechanical engineers with M.E. degree from Cornell University. 323 West 56th St., New York. 'Phone 5630 Riverside.

AUTOMOBILE INSTRUCTION.—Only practical school of automobile engineering. Our courses fit you to become a first-class experienced chauffeur with full knowledge of how to keep your machine in order. Thorough practical work in the Repair Shops of Automobile Instruction, 318 West 37th St., New York City (near 10th Ave.). 'Phone 3061 38th.

SCHOOL FOR CHAUFFEURS.—Ours is the original school of automobile instruction. Our unparalleled success has made many imitators. By careful, thorough individual work under personal supervision of the manager we always turn out not only an expert chauffeur, but a thoroughly competent mechanic able to make repairs on any machine and to keep it at all times in perfect order. Satisfaction guaranteed. Positions waiting. West Side Automobile Transportation School, 309 West 41st St., New York, N. Y.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS, INC., 146 WEST FIFTY-SIXTH STREET, NEW YORK CITY.
THOROUGH INVESTIGATION—which is invited —will prove this the best high-grade, completely equipped school for automobile instruction. Curriculum under personal direction of Prof. Chas. L. Lasche, M. E., Ph.D., School of Engineers, Columbia University. Departments include Elementary Tool and Forge Work, Assembling and Test Shop, with every type of motor; also Laboratories especially equipped to teach all component parts of an automobile. Ability of graduates assured. Day and evening classes. Special courses for owners.

Miscellaneous Announcements

Under this heading we are prepared to print "Motor Messengers" for other than trade advertisers who have a real message to deliver to motor car and motor boat owners and users. The charge is only five cents a word.

FOR SALE.—Auto garage and general repair shop; equipment complete; long established; established 1903, would consider a good mechanic for a partner. Call Valentine, 41 Central Ave., Dunkirk, N. Y.

PROPERTY for sale in Brooklyn; very desirable location for garage; floor space 7,500 square feet; would increase space 5,000 feet more. Address, C. Schubel, 141 Fulton St., New York City.

REPAIR shop for autos and carriages, situated in the heart of the auto and carriage district in New York City, 120 feet from Broadway, 50 feet from Subway station; will sell with stock, tools, six sleighs, elevator; two-year lease, which can be extended, and now doing prosperous business. Address "Lincoln," care of Motor.

WOULD buy good auto garage for sash; must be located city in New England. Answer, stating price, C. N. Richardson, Athol, Mass.

WANTED.—A man with $300 to $1,000 capital to open with advertiser in a Hudson River town of 10,000 inhabitants a thoroughly equipped automobile repair and light metal working shop; must be a thorough mechanic and An automobilist; satisfactory references furnished and required. M. D., care F. M. Snyder, 287 Union St., Hackensack, N. J.

FOR SALE.—Garage, established with Winton and Cadillac agencies for 1906, at Spokane, Wash.; fine location and a money maker; will sell at invoice price or will consider partnership. Address G. W. Miller, Broadway and Madison Sts., Seattle, Wash.

Garages

Under this heading notices of storage, repairing, electric charging, etc., are received from garages at the rate of fifte cents a word. A "Motor Messenger" in this column will bring your garage to the attention of more motor-car owners than any other publication.

HICKS AUTOMOBILE COMPANY,
1384 BEDFORD AVE., BROOKLYN, N. Y.
AGENTS FOR
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store with us; new building; rates, best service; machine and electric work. Knickerbocker, 253-5 West 64th St., New York City.

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At your service 24 hours a day.
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AMERICAN STORAGE WAREHOUSE COMPANY
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'Phone 4122 38th St. — New York City

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CARS stored and repaired at lowest reasonable prices. Terms: By the job or by the hour. All work guaranteed. Auto Transportation Co., 309 West 41st St., New York City.

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PROSPECT PARK AUTOMOBILE CO.—Largest and most complete garage building in Brooklyn. Private and 500 Union St. 'Phone 969 Prospect.

ELECTRIC supplies. Witherbee Igniter Co., 77 Thames St., New York City.

WE have opened a Sub Agency for the Jackson cars in the center of the automobile district. The Jackson Agency, 1655 Broadway, near 52d St.

PASTRES' AUTOMOBILE GARAGE, corner of Ocean Parkway and Sherman St., opposite Bader's Hotel. Telephone 851 Brooklyn. Branch at 319 Sixth Ave., corner of 13th St. Telephone 494-R South, Brooklyn.

UTICA AUTO STATION, 62-24 W. Utica St., Buffalo, N. Y. Official Station American Motor League, fully equipped garage, charging, machine shop. St. Louis Agency.

Hotels

As hundreds of motorists are readers of Motor, Hotels that cater to such people can do no better than insert a notice in this column at fifte cents per word.

HOTEL GRAMATAN, Lawrence Park, Bronxville, N. Y.—Opened June 1 and will remain open all the year. Most palatial hotel near New York; 15 miles from Grand Central Station; golf, tennis, riding, driving, etc.; refined, quiet, exclusive; capacity, 400; fine orchestra; long-distance telephone in every room; booklet. J. Lannin, Jr., proprietor; also proprietors Garden City Hotel, Long Island.

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AUTOMOBILE BROKERAGE CO., second-hand cars, 140 West 42d St.
AUTOMOBILE RENTING & TOURING CAR CO.: Hartog & Rappleyea, props., 304 West 54th St. 'Phone 1244 Columbus.
AUTOMOBILE DEPOT, INC., 221-235 West Fortieth St. 'Phones 2128 & 2127 Bryant.
AUTOMOBILE TOURS, 3 Park Pl. 'Phone 6050 Cortlandt.
A-B-C OF MOTORING, 83 Nassau St. 'Phone 304 Cortlandt.
AUTOMOBILE SCHOOL OF NEW YORK, Forty-ninth St. and Seventh Ave. 'Phone 2553 Columbus.
AUTO IMPORT CO., 1786 Broadway. 'Phone 4637-46th Columbus.
AUTOMOBILE HIRE AND SALES CO., 231-3-5 West 49th St. 'Phone 544 Bryant.
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BLACK DIAMOND AUTO CO., Lord's Court, Bldg., 27 William St.
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CENTRAL AUTO STATION, 238 West 50th St.
COLE & WOOD, Automobile Aluminum Bodies, 48-50 West 60th St. 'Phone 715 Columbus.
CHELSEA AUTO STORAGE CO., 516-520 West 57th St. 'Phone 2452-38th St.
CHELSEA SCHOOL OF AUTOMOBILE INSTRUCTION, 518 West 57th St. 'Phone 2454 38th St.
C. A. DUERR & CO., Inc., Broadway and 58th St. 'Phone 4130 Columbus.
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CAMERON CAR AGENCY, 7 West 60th St. 'Phone 4241 Columbus.
COMMISSION AUTOMOBILE CO., 742 Seventh Ave. 'Phone 2111 Columbus.
D. J. MARTYN'S AUTO REPAIR STATION, 53 East 124th St. 'Phone 1214 J. Harlem.
DEWITT AUTOMOBILE CO., 250 West 89th St.
EMPIRE AUTO CAR CO., 466-468 West 135th St. 'Phone 2880 Morningside.
F. B. STEARNS & CO., N. Y. 121 W. 89th St.
F. A. BAKER & CO., Indian Motor Cycle Station, 20 Warren St. 'Phone 6415 Cortlandt.
GUS LIND & CO., 237-23 East 47th St. 'Phone 4-9th.
HARLEM AUTOMOBILE CO., 159-163 West 127th St. 'Phone 4-9 Morningside.
HARROLDS MOTOR CAR CO., Sole agent for Pierce Arrow cars, Broadway, 58th and 59th Sts. 'Phone 535 Columbus.
HOFFMAN & SETZER, Auto Station, 1918 Jerome Ave., near 179th St. 'Phone 433 Tremont.
HEWITT MOTOR CO., 68-80 East Thirty-first St. (near 4th Ave.) 'Phone [illegible]
IRVING AUTO STATION, 128 East 19th St. 'Phone 4081 Gramercy.
JACKSON AGENCY, 131 West 29th St.
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KISSNER, A. H., tires for autos, cycles, carriages, bicycles, 132 Church St. 'Phone 2447 Cortlandt.
KNICKERBOCKER AUTO CO., 54th St.
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McINTOSH AUTO GARAGE, 130 West 102d St. 'Phone 2628 Riverside.
MOUNT MORRIS AUTO GARAGE, 27-29 West 124th St. 'Phone 800 Harlem.
NATIONAL AUTOMOBILE CO., Room 4, 102 West 42d St.
NEW YORK BRAZING COMPANY, 329 West 13th St. 'Phone 838 Chelsea.
NEW AMSTERDAM MOTOR TRANSPORTATION CO., 154-156 West 56th St. 'Phone 4668 Columbus.
NEW YORK SCHOOL OF AUTO ENGINEERS, 146 West 66th St.
NEW YORK TRANSPORTATION CO., 49th St. and 8th Ave.; Garage, 250-270 West 49th St. Branch, West Broadway and Vesey St. 'Phone 2380 Columbus.
PAUL & HEMING, Jerome Auto Station, Jerome Ave. and 166th St. 'Phone 1569 Melrose.
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THE SUNLIGHT GAS MACHINE CO., 49 Warren St. 'Phone 6145 Cortlandt.
TOURING CAR COMPANY, 310 West 59th St.
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THE WINDSOR AUTOMOBILE CO., 115 West 37th St. (formerly 523 Fifth Ave.). 'Phones 6093 and 6094 38th Street.
THE AUTO SUPPLY CO., Broadway and 54th St. 'Phone 1812 Columbus.
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LEWIS AUTOMOBILE CO., 484-88 Hancock St. 'Phone 1-2 Bedford.
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REED & DUTCHER MOTOR CAR AGENCIES, Hicks Automobile Co., 1354 Bedford Ave. 'Phone 2414 Prospect.
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BURT & CO., 24 Halsey St. 'Phone 1139 Newark.
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DECAUVILLE AGENCY, 286 Halsey St. 'Phone 2128 Newark.
ESSEX AUTOMOBILE CO., 9, 11, 13 Lombardy St. 'Phone 2056 Newark.
KINSEY & DORBINS, 129 Riverside Ave. 'Phone 2091 R. Newark.
MOTOR CAR CO. OF NEW JERSEY, 291-293 Halsey St. 'Phone 1211 Newark.
P. H. JOHNSTON COMPANY'S GARAGE, 267 Halsey St. 'Phone 6072 Newark.
P. H. JOHNSTON COMPANY, Essex County agents for Cameron and Yale automobiles and Indian motor cycles, 267 Halsey St. 'Phone 6072 Newark.

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PACKARD MOTOR CAR CO., Dept. 6

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WINTON MODEL-K



Reserve Power of the WINTON Model K

THE life of a Cannon is 100 Shots.
So say Military Experts, and Government estimates.
The life of a Motor may be estimated in similar manner—at so many Piston-strokes and Revolutions of the Crankshaft. Why not?

Now a Motor that must turn up 1,200 revolutions per minute to produce a road-speed of 30 miles an hour is *wearing out* more than twice as fast as a Motor making the same road-speed with 600 revolutions per minute. Why not?

Because there is the *distorting* influence of *Heat*, in high-speed revolution, to consider, as well as the *Wear* from friction.

And, don't forget that the piston of a Single-Cylinder Motor must work twice as *often*, to produce 600 revolutions per minute, as the two alternating pistons of a *Double*-Cylinder Motor.

That means twice the Wear—on each Piston and Cylinder—half the *Life*, per mile traveled.

In this same way a *Four* Cylinder Motor divides the *Work*, and the *Wear* of driving a single Crank-shaft, at a given speed, into *one-fourth* the effort for *each* Piston, *each* Cylinder, and *each* set of Valves that would be required from a single-cylinder motor.

Figure that out on a year's Mileage!

Now, the Winton Model K is what many call a "Surplus-powered" Car.

But there *can* be no such thing as *Surplus*-power in a Motor Car. "*Reserve*-power" is the correct term.

And "Reserve-power" can, of course, be used to obtain a racing road-speed, or track-speed.

But, it has *other* and *better* uses.

"Reserve-power," of the Winton Model K kind, translates into ease of operation, *long life*, durability, coolness of bearings in regular running, *economy* on Lubricant, Minimum Wear on bearings, on valves and friction parts.

It means all *these*, through the fact that a reserve power car like the Winton Model K can make a satisfactory road-speed with *half* to *one-fourth* the number of piston-strokes required by other Cars to *produce the same road-speed.*

That's one of the advantages in possessing "Reserve-power."

Another vital advantage in it discovered and appreciated when you want to climb a steep hill, on the *high speed gear*, *without shifting a lever* to the low-speed gear.

Or, when you have a heavy load of passengers to carry over a very bad road, and want to make good average *time* over it, without inviting any of the Party to walk, or push the Car, at any part of the tour, that is *another* occasion for the triumph of Winton Reserve-power.

Or,—when you feel it your religious duty to take the vanity out of some Motorist who wants to *pass* you on the road,—Ah, *that's* the time you glory in the splendid *Reserve-power* of your Winton Model K, which permits you to walk away from the Vain-Glorious Competitor and put him back in the dust where he wanted to put you.

Thirty Horse-power, or better, delivered *direct* to the big Driving Wheels with minimum loss in Transmission.

Worth more than a 40-Horse-power Motor would be with the *usual power-wasting Transmissions*, and with the usual faulty system of Lubrication.

Winton Speed controlled by Compressed Air—on somewhat similar principle to the Westinghouse Air Brake system, as used on Express trains.

Infallible in action, and dispensing with all need of several Speed levers in regular running.

Because, the Winton Pneumatic Control gives you a graduated Speed range of from 4 miles an hour to 50 miles an hour, by the simple pressing of your right foot on a soft spring pedal.

The more you press, the faster you go.

The less you press, the slower you go.

Take your foot off the pedal altogether, and the Winton Car automatically stops, if you wish it to stop that way.

Then, you can start it again *without leaving your seat*, and with out "Cranking," by simply shifting the Spark lever with your thumb, and pressing down Speed pedal a little with your right foot.

In eight years of constant use this strongly patented Winton Speed Control, by Compressed Air, has not *once* been known to fail in an Emergency.

The Winton Model K has
90-H.P. or better,
4-Cylinder Vertical Motor,
Cone-Clutch "Velvety" Transmission,
Precision "Shooting" Oiler,
Winton Twin-Set self-adjusting to light loads or heavy loads,
34-inch Best Pneumatic Tires,
Superb Tonneau, dashing Style, and thoroughly-tested materials!
Price, $2,500, and only one Model made this year.
Catalogue No. 4 is ready.

THE WINTON MOTOR CARRIAGE CO.

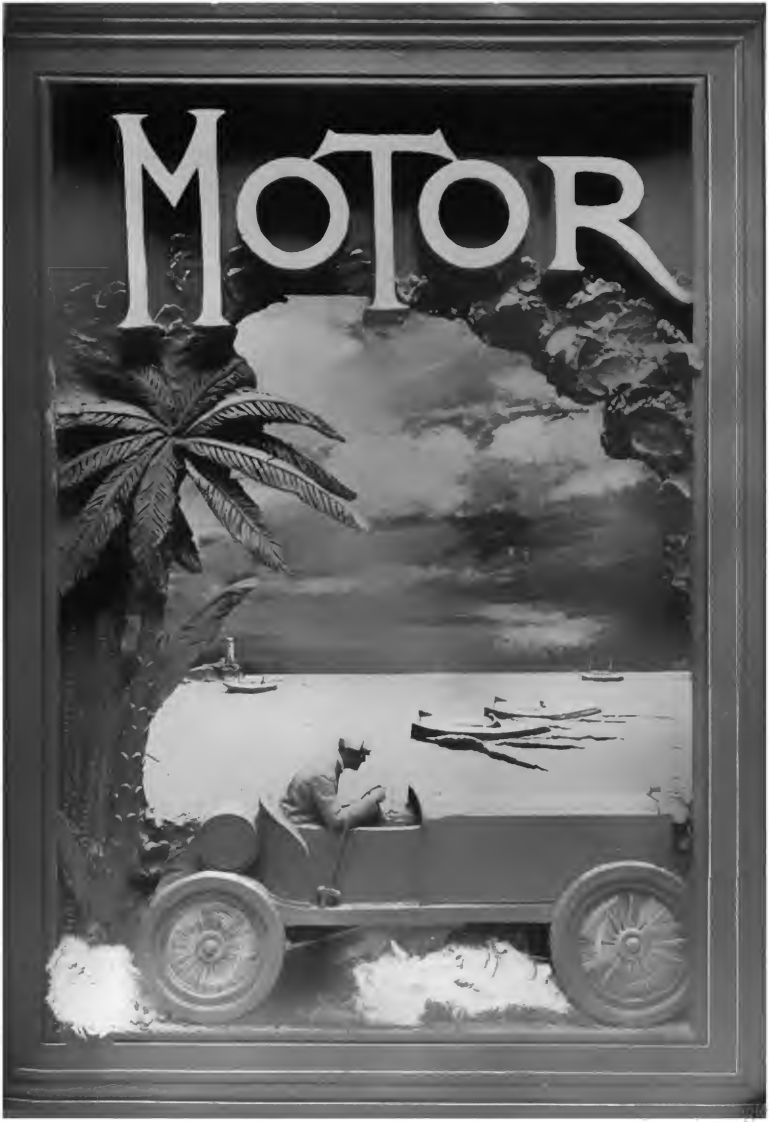
Member Association of Licensed Automobile Manufacturers

CLEVELAND, O., U. S. A.

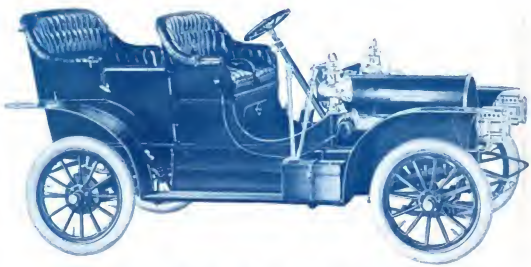
See the Winton Exhibit at the Madison Square Garden Show, New York, January 13 to 20, 1906.

BLANCHARD PRESS, NEW YORK.

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MOTOR

FRANKLIN



Type G Four-cylinder Light Touring-car. Shaft drive. 1400 pounds. $1850.

How does "Franklin air-cooling" make a more powerful engine, and an abler car for less money?

By creating a more efficient temperature in the combustion chambers than is possible in any other engine. By also getting rid of weight. By saving repair-cost and weight-cost; and by giving more days' work in a year.

The Franklin auxiliary exhaust does what no other invention ever did for a motor-car cylinder: lets out the hot, used gases before they have a chance to over-heat the cylinder. It prevents flame being carried out along the main valves to burn or pit them, and cause them to leak compression. It permits the cylinders, being cooler, to take in a larger charge, and enables the charge to do its full work freely and unhampered.

And here is an equally important fact: while Franklin cylinders do not over-heat, they also do not under-heat. A certain degree of constant heat is necessary for the best work in a gas-motor cylinder. Franklin direct air-cooling creates exactly the most efficient working temperature in the cylinder, while the Franklin auxiliary exhaust maintains this temperature constantly.

Thus the Franklin engine yields its full ability from the start, and keeps it up continuously—produces big power, saves a large percentage of the power that is lost in standard cylinders, and delivers to the Franklin rear wheels an exceptional amount of active working energy.

The weight of water-cooling apparatus—pipes, pumps, tanks, radiator, water; and the heavier frame needed to carry them—a total of some 200 useless pounds—are all dispensed with; and the power left free to carry people; and to go.

No water-cooling repairs are needed. Fuel and oil bills are small because of light weight and reduced friction. The light weight makes an enormous saving on tires.

There's nothing to freeze. A Franklin car is ready for use any minute, in any climate—365 days in the year. That brings down the cost for every day's use.

Send for the handsomest and clearest of all motor-car catalogues.

4-cylinder Runabout, $1400. 4-cylinder Touring-car, $2800.
4-cylinder Light Touring-car, $1800. 6-cylinder Touring-car, $4000.

Prices f. o. b. Syracuse, N. Y.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y. *M.A.L.A.M.*

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The Ormond-Daytona Race Meet.



A SCENE ON THE BEACH JUST BEFORE ONE OF THE RACES, SHOWING THE DARRACQ THAT WON THE VANDERBILT CUP, AND THE ENGLISH NAPIER.



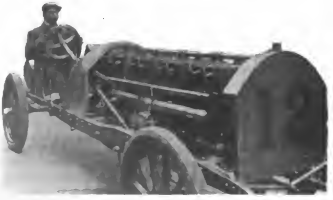
WALTER CLIFFORD EARP IN THE NAPIER.



A BRUSH BETWEEN FLETCHER AND CEDRINO IN TWO FIATS.



THE FIAT, JR., WHICH CAPTURED THE 5-MILE MIDDLE-WEIGHT RECORD.



THE SARTORI "WONDER"—THE CAR WHICH WON THE BOOBY PRIZE.

THE 200 MOTOR POWER DARRACQ MARVEL WHICH DID TWO MILES IN 58 4-5 SECONDS IN THE HANDS OF DEMOGEOT.



THE 8 CYLINDERS OF THIS CAR ARE 8¼ × 5½ INCHES AND ARE MOUNTED FOUR ON A SIDE IN A V SHAPE.

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FIAT

THE HOL-TAN CO.



New American Home of The HOL-TAN
Successors to HOLLANDER & TANGEMAN, Broadway and 56th St., New York

This five-story, fire-proof structure has been especially equipped for The HOL-TAN Co. It has a modern machine shop and special work benches and lockers for chauffeurs. A competent staff of expert machinists are always at the disposal of customers. All spare parts, including even those of the smallest importance, WILL ALWAYS BE FOUND IN STOCK. In fact the new Company will offer its patrons and the public better service in all respects than ever before.

The new 1906 model Chassis and a choice collection of "Fiat" Cars, with bodies by the best European and American builders now ready for immediate delivery.

The HOL-TAN Co.

Successors to Hollander & Tangeman

Broadway and 56th Street, New York

LICENSED IMPORTERS UNDER SELDEN PATENT SOLE AMERICAN AGENTS

AGENCIES:

Harry Fosdick Co., Boston, Mass. Rochester Automobile Co., Rochester, N. Y. H. Allen Dalley, Philadelphia, Pa.

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RENAULT

AMERICAN AGENCY



NEW 1906 10-14 H. P. 4 CYLINDER TOWN CARS
20-30 and 40-50 H. P. TOURING CARS

Literature upon request

QUIET in Operation
REFINED in Design
RELIABLE Under All Conditions

Will Exhibit at the Chicago Automobile Show

WESTERN AGENTS **AUTOMOBILE IMPORTING CO.** 124 E. QUINCY ST., CHICAGO

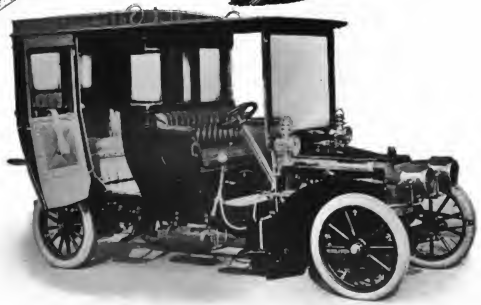
RENAULT FRÈRES AGENCY,

Tel. 5364 Madison **320-322 FIFTH AVE., NEW YORK** Cor. 32d Street

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Darracq



Coupe Limousine, 1906 Model
Particularly adapted to Winter use

Deeds, Not Words, Sell the Darracq

No car in the market can give such splendid proof of its superlative qualities. We can convince you by past performances and by present demonstrations that the Darracq car in its every detail stands to-day as absolutely the highest type of Automobile construction.

Victorious in the Vanderbilt Cup Race
Models from $5,000 to $9,000

Now in stock, ready for shipment, cars of 15-20 h.p., 24-28 h.p., 30-35 h.p. Any part of the Darracq replaced from stock within 24 hours.

American Darracq Automobile Co.

CONTROLLED BY F. A. LAROCHE COMPANY

652-664 Hudson Street 147 West 38th Street, New York

Licensed Importers under Selden Patent (No. 549,160)

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SPYKER
DUSTLESS MOTOR CAR
MADE IN HOLLAND

Exhibit at A. C. A. Show



20-24 H. P. TOURING CAR

Ready for delivery 15-20 H. P., 20-24 H. P., 32-40 H. P. cars fitted as Touring Car or with Limousine, Landaulet or Canopy tops. $4500 to $7500.

MOTOR—4 cylinder. Moulded in pairs. DRIVE—shaft, bevel gear.

All gears cut out of solid nickel steel, which we guarantee as unbreakable, making front axle only forging on machine.

Dustless—No Vibration—Most Accessible and Simple—Noiseless

Used exclusively by Sir T. Lipton, Earl of Shrewsbury, and many other prominent foreigners.

CENTRAL PARK AUTOMOBILE STORAGE CO.

Controlling Agent in U. S.

L. G. BRUGGEMANN
Manager

110th Street and Central Park West
'Phone, 6276 Riverside

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ENGLISH DAIMLER COMPANY

SOLE CONCESSIONAIRES

for

UNITED STATES and MEXICO

of the

DAIMLER MOTOR Co. Ltd.

COVENTRY ENGLAND

BY APPOINTMENT TO H. M. THE KING.

BY APPOINTMENT TO H. R. H. THE PRINCE OF WALES.



ENGLISH DAIMLER 40 H. P. LIMOUSINE

THE ENGLISH DAIMLER is THE car of England's most exacting motorists, who demand service, and all the many things that service includes. It stands in the premier class.

The ENGLISH DAIMLER will meet the most exacting demands put upon it. Durability, reliability, simplicity and beauty are the distinguishing features of the ENGLISH DAIMLER, which any American motorist may ascertain for himself.

New York Agent:
DECAUVILLE AUTOMOBILE COMPANY

The ENGLISH DAIMLER is imported to this country in the following models, which are in stock: 28-36 and 40 h.p. touring cars; 28-36 h.p. limousines; 40 h.p. chassis.

WE WILL APPOINT AGENTS FOR UNOCCUPIED TERRITORY

English Daimler Cars are Licensed under Selden Patent

English Daimler Company

1743 BROADWAY, Southwest Corner of 56th ST.

New York

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DECAUVILLE

THE GREATEST SELECTION

¶—both as to PRICE and MODELS—is an exclusive privilege offered prospective purchasers by The Decauville Company *only*.

As to PRICE——¶Our price-scale ranges from the lowest-priced car (consistent with satisfactory service) to the most expensive motor-car manufactured.

As to MODELS—¶In each price group may be had *every* variety of model now in practical use, either at home or abroad.

Made POSSIBLE—¶Because The Decauville Company has just completed the largest automobile sales room and garage in the *world*, and at these headquarters, the company has installed *the most complete* line of motor-cars—both as to variety in *Price* and *Models*—exhibited *anywhere* in America.

Our MOTTO——¶The lowest prices in the market consistent with *positively certain* satisfactory results.



Decauville

Licensed Importers Under Selden Patent



C. G. V.

Agents for D A C AUTOMOBILE SUPPLIES



English Daimler

Agents for Guaranteed Gaulois Tires

Metropolitan Agents for Franklin Cars

WRITE for our beautifully illustrated catalogue, or call in person at our Broadway Garage. The wonderfully interesting exhibit always going on at this great automobile warehouse is making Decauville headquarters one of the "sights" of the city. No obligation to buy, whatever, is either implied or expected from those who visit these really remarkable display rooms.

BROADWAY AT 56TH ST., NEW YORK CITY

AUTOMOBILE CO.

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HOTCHKISS==DE LEON

Sole representatives in the United States

HOTCHKISS

35 H. P.



Chassis
$6,500

Complete
$8,000

Built like a Gun by Gun Makers, HOTCHKISS & CIE., France

DE LEON

A 35 H. P. Car at $5,000, which is a new one in America, but worthy of careful inspection.

The HOTCHKISS and the DE LEON will be

Sold Under a 365-Day Guarantee

AGENCIES WILL BE ESTABLISHED

ARCHER & COMPANY

1597 Broadway NEW YORK 231 West 40th St.

CARS WILL BE LICENSED UNDER SELDEN PATENT

EXHIBITING AT THE OOLISEUM

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INVESTIGATE



THE MERITS OF THE VIQUEOT

THE CAR THAT WITHSTANDS THE CLOSEST POSSIBLE SCRUTINY UNDER THE MOST POWERFUL RAYS OF THE STRONGEST SEARCHLIGHT

28-32 Horse Power. } **Silent, Simple, Ease of Control.**
40-45 Horse Power. } **Speed 5 to 70 Miles an Hour on High Gear.**

¶ The Viqueot Cars are made by the Viqueot Company at its own works in France. The Viqueot Company is the only American concern manufacturing automobiles in France with its headquarters in America. ¶ The purchaser therefore receives the greatest possible value in buying a Viqueot, because Viqueot Cars are sold direct and guaranteed by the Viqueot Company, thus eliminating the usual commissions and enormous profits of dealers and agents, and assuring to the purchaser complete satisfaction in his dealings with the company at its home office. ¶ We have ready for immediate delivery, double Phaetons, tulip form; Limousines and Detachable Limousines and Landaulets in all colors and trimmings to suit all tastes. Bodies and chassis painted and trimmed to meet the special requirements of the purchaser. ¶ The design of the chassis and the improvements which have been made give the Viqueot a superiority over other cars. We challenge comparison with any make car for general results and economy in operation.

The ability of the Viqueot Car to negotiate steep grades on the high gear admits of no comparison

28-32 H. P., $5,000.00 **40-45 H. P., $7,500.00**

These prices include the complete car ready for the road with all additional equipment such as Tire Holders Side Seats Extra Tool Boxes Gabriel Horn, Baggage Rack and other requisites always charged as extras Do not buy an automobile until you have seen the Viqueot. Remember that the Viqueot car is sold directly by the Viqueot Company and has no connection whatever with any dealer or agent of automobiles

THE VIQUEOT COMPANY, General Offices and Salesrooms: 215-217 West 48th Street, New York

WORKS PARIS, FRANCE. Sole representative in the U. S. for Oleo Spark Plug and Oleo Accessories

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"GALLIA"

1. Mileage capacity on one charge, 50-60 miles.
2. Maximum speed, 20 miles an hour.
3. Great softness of control, due to eight speeds.

By Special Appointment to H. M. the King of Spain

First Gold Medal (Highest Award) Paris, Salon 1901-1902-1904

4. Light weight, 4,000 lbs.
5. Combination of elegance and comfort.
6. Great clearance, due to batteries not located under chassis.

ELECTRIC CARRIAGES

AMERICAN BRANCH

BERNARD MAURICE DUFRESNE COUNT ARMAND de GONTAUT BIRON

152-154 West Thirty-eighth Street Telephone, 543—38th NEW YORK CITY



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PIERCE



This is the Pierce Great Arrow, 28-32 H. P., with straight tonneau body, cape top and folding glass front. Price without top or glass front, $4,000. Cape top, $200 extra. Folding glass front, $50 extra.

One convincing proof of the excellence of Pierce Cars is the fact that they appeal most to the most mechanical minds. An automobile is a machine. The more a man understands about the principles of mechanics, the better he appreciates the way in which the Pierce Arrow is made.

The initial cost of a Pierce Arrow is greater than that of any automobile made in this country, but the price seems low when compared, not only with the small cost of maintaining, but with the long time of service given.

Pierce Arrows are never out of date as far as effective service is concerned.

Catalogue and descriptions mailed on request.

THE GEORGE N. PIERCE COMPANY

Buffalo, N. Y.

Members Association Licensed Automobile Manufacturers.

LIST OF DEALERS

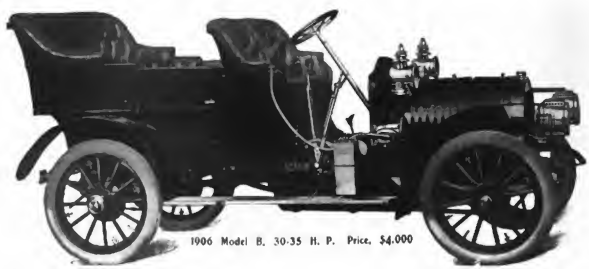
BOSTON,	J. W. Maguire Co., 745 Boylston St.
BALTIMORE,	Southern Auto. Co., 2021 Maryland Ave.
BUFFALO,	The George N. Pierce Co., 752 Main St. (Retail).
CHICAGO,	H. Paulman & Co., 1321 Michigan Ave.
DETROIT,	J. P. Schmeider, 189 Jefferson Ave.
DENVER,	The George N. Pierce Co., 1643 California St.
GENEVA, N. Y.,	J. A. Place.
HARTFORD, CONN.,	The Miner Garage Co., 120 Allyn St.
HOUSTON, TEX.,	Hawkins Auto. & Gas Engine Co.
KANSAS CITY, MO.,	E. P. Moriarty & Co., 1612 Grand Ave.
LOS ANGELES,	Bush & Burge, Cor. Seventh and Main Sts.
LOUISVILLE,	The Zorn-Strauss Co., Inc.
MILWAUKEE,	Hibbard Automobile Co.
NEW YORK,	Harrolds Motor Car Company, Broadway, 58-59th Sts.
OTTAWA and MONTREAL,	Wilson & Co., 142 Bank St.
OAKLAND, CAL.,	The George N. Pierce Co., 1013 Clay St. (Wholesale).
PITTSBURG,	Banker Bros. Co., Baum & Beatty Sts.
PHILADELPHIA,	Foss-Hughes Motor Car Co., 201 N. Broad St.
PORTLAND, OREGON,	Covey & Cook Motor Car Co.
PORTLAND, ME.,	J. A. Dowling.
PROVIDENCE,	The Shepard Company.
ROCHESTER,	U. S. Automobile Co., 21 Plymouth Ave.
SAN FRANCISCO,	Mobile Garage Co., Golden Gate Ave. and Gough St.
SARATOGA SPRINGS,	W. L. Hodges, 16 Woodlawn Ave.
SCRANTON, PA.,	Standard Motor Car Co.
SHEFFIELD, PA.,	C. H. Smith Co., Ltd.
SPRINGFIELD, MASS.,	E. R. Clark Auto. Co., 117 Lyman St.
SYRACUSE,	Amos-Pierce Auto. Co., 109 S. State St.
ST. LOUIS,	Western Auto. Co., 4701 Washington Boulevard.
ST. PAUL,	C. P. Joy Auto. Co., 368 Minnesota St.
SEATTLE, WASH.,	Broadway Auto. Co.
TITUSVILLE, PA.,	A. E. Lambert.
TORONTO,	Auto. and Supply Co., Ltd., 24 Temperance St.
TROY, N. Y.,	Troy Auto. Exchange, 22 Fourth St.
UTICA, N. Y.,	Utica Motor Car Co.

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Rainier

The Pullman of Motor Cars



1906 Model B. 30-35 H. P. Price, $4,000

Guaranteed Free of Repairs for One Year

During 1905 the Rainier was the hit of the season in New York, the most critical of markets. Not a single dissatisfied customer, only favorable comments everywhere and orders galore for the new model from former users. Before you decide, investigate the Rainier, carrying the world's broadest automobile guarantee.

Make and break spark. Simms-Bosch Magneto. Bevel gear drive.

The Rainier Company, Broadway, cor. 50th St., New York

CHICAGO BRANCH: 1253-1255 Michigan Ave. (after January 15th).
BOSTON AGENTS: Morrison-Tyler Motor Co., 121 Massachusetts Ave.

Good Agents wanted in unassigned territory

The Rainier Car will be Exhibited at the Armory Show in Chicago.

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Locomobile

"EASILY THE BEST BUILT CAR IN AMERICA"

15-20 H.P., $3,000 **30-35 H.P., $5,000**

These models are almost identical in design; contain the same carefully selected materials; and are constructed throughout with equal care. Both models are furnished with complete touring equipment



Type E
Locomobile
Price $3,000
Tan and leggage carrier extra

Specifications of Type "E" 15-20 H. P. *Locomobile*

Equipment—5 brass lamps; horn; tire carrier, jack; tools and extra parts; locked box with trays for tools and parts; compartment carrying 4 tin cases for extra lubricants.

Motor—4 cylinder, 3¾ inch bore, 4½ inch stroke; manganese bronze base; gears enclosed. Same general type as made by us for four seasons.

Crank Shaft—Machined from one solid forging.

Cam Shafts—Hardened ground forgings—one solid piece.

Carbureter—Automatic type with balanced throttle valve.

Ignition—Make and break system used by us for the second season. Ignition cams solid with admission cam shaft which slides in bearings to advance or retard spark.

Magneto—Low tension, our design; permanent magnets from the best makers in the world; impossible to disturb any electrical adjustments by removing or replacing magnets. Oil proof armature.

Lubricator—Large mechanical oiler. Large supply pipes.

Governor—Centrifugal type, prompt and positive in action.

Control—Gas and spark levers on steering wheel.

NOTE—Our 30-35 H. P. *Locomobile*, Type "H," **$5,000,** is intended for those requiring greater power and greater seating capacity. The specifications are the same as those printed above with the following exceptions: Motor, 4¼ in. bore, 5½ in. stroke. Body seats 5 to 7 persons; Tires, 34 ins. x 4½ ins., front and rear. Wheel Base, 109 ins. Full illustrated descriptive matter of both cars on application to factory or any branch office.

Clutch—Cone type with ample leather face.

Universal Joint—Between clutch and transmission.

Transmission—4 speeds and reverse; direct drive on high gear; clutch shifting mechanism, gears, bearings, and differential all encased and lubricated by same oiling system.

Drive—Double side chains; hardened sprockets.

Running Brake—Double acting type; 35½ x 10 ins. located on differential shaft, metal to metal surfaces.

Emergency Brakes—Internal expansion type, compensated. Large and powerful, metal to metal surfaces.

Sprocket Drum—Bolted to each rear wheel spoke.

Axles—"I" section axles front and rear.

Tires—32 x 4 ins. on all four wheels. Larger than the size recommended by the Tire Association.

Body—Double side entrance, seating 5; extra wide doors; fitted with top irons; color and striping optional; running boards, covered with pyramid rubber bound with brass.

Wheel Base—93 ins.

For 10c. in stamps we will mail 12 souvenir postal cards showing 12 different views of the *Locomobile* running in the Vanderbilt Cup Race, making the best showing of any American car in any International contest. For 10c. in stamps we will mail a five-color poster showing the *Locomobile* finishing the race. This poster may be framed with or without printed border.

The *Locomobile* Company of America, Bridgeport, Conn.

NEW YORK, Broadway and 76th Street
PHILADELPHIA, 240 N. Broad Street
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White Limousine



White Touring Car

To Those Who Did Not See Our Exhibit at the Armory Show

AS was quite appropriate, White cars were exhibited in the largest space allotted to any company at either Show. No less than six types of the Model "F" White car were on view and received the admiration of thousands of visitors.

If you missed this exhibit, the best consolation for you is to read our new catalog. All of our new models are completely described and illustrated therein. There is also included a short historical sketch, tracing the gradual development and perfection of steam machinery from Newcomen's engine of 1705, to the invention of the White generator. Brief references are made to some of the more notable triumphs of White cars in each year, commencing with 1901.

If you will write to us we will be very glad to send copy of the catalog and also to put you in touch with our nearest agent.

White Sewing Machine Company

Cleveland, Ohio



White Landaulet



White Runabout

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Why no car should satisfy you but The Thomas-Flyer

IT is impossible in these announcements to convey a complete and comprehensive idea of the manifold mechanical superiorities of the Thomas-Flyer. But it is possible to point out a few dominant features peculiar to this magnificent car which have won for it the high honor of representing America against the world in automobile manufacture.

From time to time we shall try to describe for you special features which are essential to your comfort and satisfaction and which you should insist upon having. In this announcement we group a few of the special Thomas advantages calling special attention to the valuable Thomas Safety Device.

THE CAR YOU BUY SHOULD PROVIDE:—A speed of from *six* to *sixty* miles per hour on the high gear, quietly, smoothly without rock or jar; *fifty horse power;* mechanically operated valves; and separate cylinder—great flexibility enabling you to take the steepest grades or the most crowded streets without change of gear.

THE CAR YOU BUY should be able to take a 14 per cent. grade as the Thomas has done, carrying five people, on the high grade showing a speed at the summit of the hill of 40 miles an hour.

THE CAR YOU BUY should have a dust-proof body. The Thomas body is patented. There is not a straight line in its design. Dust suction is entirely eliminated. The dust does not rise until it is fifty feet behind the car. Ladies can travel an indefinite distance without fear of dusting their traveling costumes.

THE CAR YOU BUY should seat seven as does the Thomas—two in front and five in the rear. It should have two revolving chairs which are removable and may be placed under the cushion. It should be luxuriously upholstered in the best hand buffed leather, curled gray hair and springs. Shawl and coat racks; luggage box for two large suit cases, straps, tire and tool box.

THE CAR YOU BUY should have a clutch equal to the Thomas clutch on which patents are pending. Three metallic discs—a perfect clutch not susceptible of any improvements. After the most rigid and exhaustive tests of thousands of miles under adverse conditions with extra heavy loads, the Thomas clutch has the reputation of never having shattered the car in starting; slipped or given the least trouble.

THE CAR YOU BUY should have a transmission equal to the patented Thomas transmission. A point of most vital importance. Selective type. Four speeds forward and reverse. Noiseless. Possesses the exclusive features of roller bearing on forward end of main transmission shaft and five Hess Bright bearings and large ball-thrust bearing with drive direct on the high speed without a gear in mesh. Very large spur gear differential. Wide faced gears and anti-stripping device which renders it absolutely impossible to strip the gears. Gears may be changed between high and low without passing through intermediate gears. The strongest and most efficient and most costly transmission in use.

THE CAR YOU BUY should have the commutator on the dash board. Various attempts have been made at home and abroad to locate the commutator on the dash board. The Thomas method has proven successful. The others have not.

THE CAR YOU BUY should use a single coil. With one exception all attempts to accomplish this have been unsuccessful, save in the case of the Thomas. Only one adjustment of vibrator required for all cylinders.

The Celebrated Thomas Safety Device

You do not need to be told how many lives have been lost by cars backing down hill. Are you not entitled to be guaranteed against the danger of any such accident? Is not the Thomas Safety Device absolutely essential to your safety? Every Thomas automobile turned out is equipped with the Thomas Safety Device, a peculiar ratchet cast integral with the brake and sprocket drum on the rear hubs, the co-acting pawl being pivoted to the brake spider. It is operated by hand lever on the right side of the dash-board to which the pawl is connected by a wire cable. This safety device positively prevents the car from backing down hill should the engine stop. It can be used in place of the brake when stopping on a hill. This makes the Thomas car particularly adapted for use in hilly sections, and renders accidents from backing an impossibility. It is one of the distinctive and exclusive features of the Thomas.

Get in touch with the nearest Thomas representative and place your order at the earliest possible moment. Write for illustrated catalogue.

The Thomas Motor Company, Niagara St., Buffalo, N. Y.

Members Association Licensed Automobile Manufacturers

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THE "Matheson" touring car is designed to compete principally with the very finest and highest priced cars of foreign make. Its exceptional qualities and superior operation can only be fully appreciated by *actual comparison* with others, *part for part*, and by *actual long-distance road demonstration*. It is, without any exception, far and away the most thoroughly mechanical, the strongest built, the most powerful, the fastest, the handsomest and the most completely equipped car on the market to-day.



Characteristic Features:

Self-starting from the seat.
Make-and-break ignition with magneto.
Four-cylinder vertical engine.
All valves in the head mechanically operated.
Valves never require regrinding.
All valve-actuating mechanism on top of engine quickly accessible.
Absence of vibration.
Noiseless in operation.
Automatic, wide-range, multiple-spray carburetor; will stay adjusted and vaporize any grade of gasolene.
Automatic speed control by governor.
Automatic lubrication, multiple, positive, force feed.
Clutch, multiple disc, metal to metal. Will run thousands of miles without adjusting.
Sliding-gear transmission, chrome nickel steel.
Hess-Bright (imported) ball bearings on transmission shafts, differential shafts, steering knuckles, and in clutch actuating mechanism.
Roller bearings on all wheels.
Extra large bearings throughout, insuring long life.
Double chain drive.
Four especially powerful brakes.
Hill-pawl prevents car backing down grade.
Irreversible steering gear.
Axles, special nickel-steel forgings; I-beam pattern.
Nickel-steel frame, cold rolled pressed.
Flexible reciprocating rotary spring suspension, eliminating all torsional strains on front and rear springs.
Radiator, honeycomb type.
Gasolene tank, capacity 20 gallons.
Long half-elliptic springs front and rear.
Aluminum pan underneath car.
Tires, 36x4 inches front; 36x4½ inches rear.
Wheel base, 40-45 H.P., 112 inches. 60-65 H. P. 118 inches.
Side-entrance aluminum bodies, superbly finished; the unparalleled production of J. M. Quimby & Co. and Moore-Munger Co., luxuriously upholstered.
Weight, 40-45 H. P., 2,960 lbs.; 60-65 H. P. 3,160 lbs.
Speed guaranteed: 40-45 H. P., 60 miles per hour; 60-65 H. P., 70 miles per hour. Geared for greater speed, if desired.

"America's Finest Motor Car"
ONE YEAR GUARANTEE
"Matheson"
40-45 H.P. $6,000 60-65 H.P. $7,500
With Complete Equipment Below

OUR COMPLETE EQUIPMENT CONSISTS OF:

Cape-Carte top
Storm curtains
Standing glass front
Detachable folding seats, with lazy backs
Foot cushions
Mats front and rear
Large leather wallet
Toilet set of comb, brush, mirror, whisk-broom & soap case
Tool & accessory lock drawers
Folding baggage rack
Tire irons for carrying extra tires at side of car
Tire covers, waterproof
Coat rail
Truffault-Hartford shock absorbers
Acetylene generator or gas tank
Acetylene head-lights, oil side lamps, tail lamps
Large dragon horn
Gabriel horn
Gasolene gauge
Grademeter
Reserve tank lubricating oil
Jones Odometer-Speedometer
Complete set tools and tire repair outfit
Water gauge
Dashboard 8-day clock
Monogram on doors
Extra parts, etc.

COMPLETE CATALOGUE GIVING FULL DETAILS MAILED UPON REQUEST.

MATHESON MOTOR CAR CO., - - WILKES-BARRE, PENN.
Member Association Licensed Automobile Manufacturers (Formerly Holyoke, Mass.)

N. B. - Our new factory is one of the largest and most modern automobile plants in the world.

For advertisements received too late for classification see the last five advertising pages.

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MOTOR'S INFORMATION BUREAU

There are two sections to every magazine—the editorial and the advertising. Neither is more important than the other. The reader buys a magazine for the interest which the editorial section has for him, and he expects the advertising section to be an *information* bureau of his needs.

The advertising pages of this issue of Motor, should be carefully read as the text pages, because they are its readers' *information bureau*. If you wish to buy a motor car, you will find the standard makes advertised in Motor. If you wish tires, lamps, motor-car accessories, etc., you will find only the standard makes of anything represented in Motor's advertising pages.

Never hesitate to write to advertisers for more complete information than the advertisements contain. You incur no obligation, if you do. Aund when you do, kindly mention Motor.

For information about anything not in Motor, write us and we will see that you are informed.

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MOTOR BUREAU

A Practical Plan for the Sale and Purchase of Second-Hand Cars

The buyer who waits till Spring before selecting a second-hand car is apt to find that he must wait, sometimes weeks, for his turn before his car can be received at a trustworthy shop for overhauling. When he gets the car back, he may find that the work has been hurried, and there are always some details, too miscellaneous to be put in the shop job, which must be attended to, before the car is in perfect order.

By purchasing in the early winter, the buyer has a chance to get acquainted with his car, and to have it overhauled under his own supervision before the Spring rush begins. Liberal allowance for these always-essential preparatory steps will often mean the difference between a successful season and a disappointment.

MOTOR BUREAU helps sellers by listing their cars offered for sale. It assists buyers by sending them descriptions of all listed cars likely to meet their requirements. A fee of $1 is charged in either case, which in addition entitles the payer to a 20-word "want" or "for sale" advertisement in Motor.

Your car or your want is put on our list immediately upon receipt of your dollar. If you write us for a car, you will receive an immediate answer telling you what we have listed. If you wish to sell your car, type-written copies of its specifications are made, and sent to prospective purchasers.

This plan eliminates the necessity of waiting several weeks for your advertisement to appear, and also seems to be the solution of the problem at present confronting automobile enthusiasts who have not the ready advantages of an up-to-date exchange house in their vicinity.

Our list is kept thoroughly up-to-date. We take particular care each month to eliminate all cars that are sold. If you are selling a car through us we keep that car on our list until it is sold, and vice versa, if you write us for a car we keep your specifications before us, and we have done everything in our power to satisfy you.

Further particulars may be had by addressing MOTOR BUREAU, 1789 Broadway, or H. L. Towle, 150 Nassau St., New York City.

If you want to sell your Car

Fill out the coupon below and send it to us with $1, sent at our risk.

Fill out—Tear out—Mail to-day.

Motor Bureau,
1789 Broadway, New York City.

Enclosed find $1, for which please enter on your list the car described below. I understand that you will without additional charge give this car a 20 word "For Sale" advertisement in Motor, and also quote it to all prospective purchasers who are looking for a car of the following description:

Name of Car.....

Model or Date.....

H. P. .....No. Cyls.....

Asking price.....

Extras .....

.....

Remarks on condition, etc. (Make these as specific as possible).....

.....

.....

If you want to buy a Car

State whether you want gasolene, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

Buyers wishing cars inspected, tested, or overhauled under expert supervision are referred to Herbert L. Towle, consulting engineer of MOTOR BUREAU, who does this work at a fair rate for time spent. Mr. Towle's advice is given solely in the interest of the purchaser and is confined to used cars only.

Advertising Rates.

Five cents a word under all headings, payable in advance. Advertisements may be sent "Care of Motor," and answers will be forwarded free of charge. No advertisement accepted for less than $1.

Second-Hand Cars for Sale

Under this heading second-hand cars are advertised for sale at the rate of five cents a word, cash in advance. These columns are open to dealers as well as to owners of private cars. If you have a car for sale, you can reach more prospective purchasers by a "Motor Messenger" in Motor than through any other American medium.

COLUMBIA, 1905, mark 44, $1,200; 30p, Michelin tires; cost $2,000, bought larger car same make. Astor, 97 Central Ave., Albany, N. Y.

FRANKLIN, new 1906, 20 H.P., touring car, delivery in February for $2,500. Address H. W. G., care of Motor.

HAYNES-APPERSON, 40 H.P., 1905 touring car, fully equipped with top, Gabriel horn, presto-lite tank, complete lamps, worth $1,000; $1,800 takes it. Indiana Auto Co., Indianapolis, Ind.

LOCOMOBILE, 1902 model in good shape and fitted with 1903 top, pump, Price, $1100. George Hand Patterson, Red Bank, N. J.

TWENTY-H.P. 1905 Locomobile touring car, with top; in perfect condition; price, $2,000. H. C. Raymond, 1132 Majestic Bldg., Detroit, Mich.

LOCOMOBILE, new stock car, 4 cylinders, rear entrance, bargain for some one. Automobile, 97 Central Ave., Albany, N. Y.

MARION, 4 cylinders, detachable tonneau; seats 5; Fisk detachable tires; list, $1,500; fine condition; immediate delivery, $1,000. F. S. Newcomb, New London, Conn.

MARION, 4-cylinder, 16 H.P., runabout for $950. Winton, 1902, with top, $800. Felker Auto Co., Denver, Colo.

MAXWELL, 1905, touring car, equipped with top, presto-lite gas tank, headlight; in first-class condition; $1,200 takes it. Indiana Auto Co., Indianapolis, Ind.

MAXWELL, 1906 model, touring car, new, equipped with Searchlight, out of factory about 40 days, $1,300. Indiana Automobile Co., Indianapolis, Ind.

OLDSMOBILE runabout for sale. As order, tires nearly new, cheap for cash. John H. Dill, Spicewood, N. J.

OLDSMOBILE, 2 cylinders, 20 H.P., equipped with top, baskets, two gas lamps, $600. The F. R. Clark Auto Co., Springfield, Mass.

OLDS, 1905, 10 H.P., light touring car, detachable tonneau, in the best of condition; has been used only on paved streets; price very reasonable. Address L. W. Hoskins, Shreveport, La.

1905 MODEL, 16 H.P., Orient tonneau, 4 cylinders, air cooled. New May, 1905, with one new shoe, two new tubes. Rushmore lights extra. Owner making room for larger car. Price, $950. Address Box 412, Yonkers, N. Y.

PACKARD, Model "N," $2,150; fine shape. F. E. Avery, Columbus, Ohio.

1903 PEERLESS, 1902 Auto car, 1901 White Steam Stanhope, 1904 Franklin tonneau, Ford, Speedway and others. Prices right. Hartman & Co., Nashua, N. H.

PEERLESS, 2-cylinder, touring car, extra tire, searchlights, horn, etc., in good condition; cost with extras, $3,000; will sell at a bargain; write for particulars and mention Motor. Phillips, 133 West 3rd St., New York City.

SANTOS, 4 cylinders, 20 H.P., canopy top, fine order, good for 40 miles per hour. F. Avery, Columbus, Ohio.

STANLEY, 1905, good condition, new tires, $275 if taken now. F. W. Sanborn, Concord, N. H.

STEVENS-DURYEA, 10 H.P., 2-cylinder runabout, with top; run 1,500 miles, $500. Felker Auto Co., Denver, Colo.

THOMAS CAR, 1905, top lamps, everything best condition, price $1,500 cash. J. D. Thompson, 28 Fast 28th St., New York City.

WHITE Stanhopes; have one in fairly good condition, $150; one in extra fine condition with 20inch tiry fouler, $200. Portland Garage, Portland, Me.

WINTONS, 1903, one with canopy top, new 5-in. tires rear, $500; one without top, 4½-in. tires, $400. Both in good repair. F. S. Avery, Columbus, Ohio.

WINTON, 1903, touring car, guaranteed in first-class condition, new tires, lamps, horn, everything complete, price $650. Indiana Auto Co., Indianapolis, Ind.

FOR SALE, second-hand automobiles at exceedingly low prices; get our latest bargain sheet. Portland Garage, Portland, Me.

1905 Royal Tourist Cars in excellent condition; taken in trade for 1906 Royals; we have several of these cars for prompt delivery. C. A. Duerr & Co. (Incorporated), 1787 Broadway, New York City.

FOR SALE—Rambler Touring Car, single cylinder; all in A1 condition; price $450; or will exchange for model B Cadillac runabout. Theo. F. Clark, Englishtown, N. J.

PANHARD, 15 H. P. Touring Car, 1903 model; new body; first-class condition; price, $1,100; The Auto Mart, 37th St. and 7th Ave., New York City.

THOMAS Single Cylinder Touring Car, seating five; sliding gear transmission; direct drive; very cheap. The Auto Mart, 37th St. and 7th Ave., New York City.

1905 THOMAS Car in good condition; 40 H. P. Barry S. Houpt, 733 Seventh Ave., New York City.

CADILLAC, model "B" run only 3,000 miles; tonneau; three seats; extras; tools, etc.; overhauled this spring; condition first class; rock bottom price, $450. E. H. Davis, Evart, Mich.

BARGAIN.—1904 White Steamer, in first-class condition, looks like new, nearly; not using it; thoroughly reliable; buy the best. Alfred L. Willson, 109 Miller Ave., Columbus, Ohio.

FOR SALE, VERY CHEAP, Ford 4-cylinder; Ford 2-cylinder; Winton 2-cylinder; Rambler 2-cylinder; imported Rambler 4-cylinder; Orient Buckboard; made by 1905 cars; prices and descriptions extremely interesting; a card will bring the information. E. S. Touse, Reading, Pa.

WHITE Steamer, Limousine, 1905, 25 H. P., 2 cyl. Tools, lamps, and Hartford Suspension, in good condition. Overhauled by White Motor Co. A. C. Keene, 128 Lexington Ave., New York City.

WINTON, Model B, with cape top, full set lamps, 1906 improvements, cost $3,000. Will sell for $1,800 cash. H. O. Keller, Reading, Pa.

FOR SALE.—Model B Winton, canopy top, five lamps, 1906 improvements, cost $3,000, will take $1,800 cash. H. O. Keller, Reading, Pa.

FORD, 5 passenger, model C, used for demonstrations only. Repaired and in perfect condition. Olds 15 runabout, new, both cheap. Harrisburg Auto Co., Harrisburg, Pa.

MARION 1905 detachable tonneau touring car, cape top, just back from factory; '06 improvements, used 1000 miles, repainted, cheap. Harrisburg Auto Co., Harrisburg, Pa.

WHITE steamer, 1904 Model D. Used but little, in excellent condition. 30 to 20 H. P.; cost $2,000 without extras. A. L. Willson, 109 Miller Ave., Columbus, Ohio.

1904 POPE-TOLEDO, just been thoroughly overhauled and guaranteed to be in new order; only $1,300. C. E. Armstrong, Lock Haven, Pa.

FOR SALE.—Standard Oldsmobile runabout, with rear seat, folding box; storm apron, and horn; purchased in June, 1905. Cost with extras, $700. First $500 takes it. In fine condition. Hamlin Barnes, Wellsville, Ohio.

SNAPS GALORE.

Not clucks but A1 Autos. Absolutely put in A1 order and good for hard work.

Columbia 45 H.P., top, etc., $1,150, cost $4,000. Panhard, $800. Northern, 1st model, touring car, $250. 40 H.P. Thomas, $1,650. Rocket Schmoller, $2,300. Martini, $3,000, 15 H.P. Panhard, side-entrance, $3,000. Cadillac, $275, $350, $600, $1,000, all styles. Ford, $300. White Steamers, $350 to $1,000. Marion, 1905, $750. Knox, $300. Locomobile, gasoline, $800. Franklins, 1904, $550 to $700. Decauville, like new, $1,200 to $1,500. Searchmont, $500. Mathewson, $2,000. 150 more, also lamps, tires, tools, etc., dirt cheap.

Broadway Automobile Exchange
1511-513-515 Seventh Ave., New York City

For advertisements received too late for classification see the last five advertising pages.

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BIG VALUES
in
Slightly used Automobiles

When you reflect how much trading there is in automobiles, and new ones replacing old ones, it is easily understood why we always have over 250 on hand, despite rapid sales. Doing the largest business in this line we are in many instances offer prices less than one half what others ask.

TONNEAUS, $325 to $4,000

You will find every make of both American and foreign cars here. To mention our entire list, would take much money and several pages of MOTOR. We have had as high as 40 cars, left with us on consignment in one week. Send for list.

STEAMERS and ELECTRICS

Mobilets, $175; Pope Toledos, $300 up; Stanley and Prescott Steamers, $250 up; Electric Runabouts, Broughams, Cabriolets and Hansoms, $200 up. We have the largest line of electrics in the World.

RUNABOUTS, $200 UP

Rambler, Remington, Olds, Loco, Auto Car and other makes. Stock the largest, prices the lowest. No matter what make you want or price limit you may fix, we can suit you. Send for list.

MANHATTAN STORAGE COMPANY
Largest Auto Dealers in the World
334-340 WEST 44th ST., NEW YORK
2 blocks from 42nd St., 34th to 8th Ave., "L". 2 blocks from Broadway

AUTO CAR, type 8, in good condition, gas lamps, $700. Clark Auto Co., Springfield, Mass.

AUTO CAR, type 10, 1904, $550; a 1905 for $750; cape tops on both. E. R. Clark, Springfield, Mass.

CADILLAC, new model, F, 1905, just bought, but want to trade for large machine; guaranteed new; first check $850 takes it. Arthur Dickey, care of Indiana Auto Co., Indianapolis, Ind.

CADILLAC, Model B, in perfect running order; 35 or 252 H.P. tires on rear wheels in September; fine tamp; Dietz generator and Dietz gas lamps. Address H. J. W., 24 Argyle Place, Cortland, N. Y.

FORD, 1904, 8 H.P. touring car, rebuilt, reversible steering, French hood, lamps, etc. Price, $375. F. L. Johnson, Concord, N. H.

FRANKLIN MODEL "E," 1906. Improvements including Model C force feed oiler and enlarged auxiliary exhaust ports with 1906 auxiliary valves. Car fitted with Franklin glass front canopy top and Jones speedometer. Car thoroughly overhauled and new engine put in at the factory last Fall; newly painted, tires in good condition. Car used for demonstration purposes; very speedy. Cost complete with improvements, $1,650. Will sell for $1,200. Will demonstrate. Cook & Stoddard Company, Washington, D. C.

FRANKLIN RUNABOUT in the best of condition, tires all right, want a large car. Cash, $750. H. H. Knowles, East Liverpool, Ohio.

OLDSMOBILE, 1-cyl., 1904, tonneau touring car; extra good condition; price, $500. Chas. B. Scott, Scranton, Pa.

24 H.P. POPE-TOLEDO, newly painted royal blue, cream running gear, has been thoroughly overhauled and guaranteed in A-1 condition. Price, $1,200. 35 H.P. POPE-TOLEDO, 1905, 7-passenger touring, canopy top. Original price, $3,750; will accept $2,000.

14 H.P. MOTOCAR with tonneau, 1904 model; easily convertible into a side entrance; has been well taken care of and is in good condition. Price, $650.

1903 Auto Runabout; practically new; has been run about three weeks. Price, $700. Orlando F. Weber Co., 1329 Michigan Ave., Chicago, Ill.

PACKARD, 1905 model, cape top, $500 in useful extras; great bargain. C. P. Warner, 1220 Michigan Ave., Chicago, Ill.

WAYNE, 20-H.P. touring car, side entrances; cost $1,250 last June; run less than 1,500 miles; guaranteed in perfect condition; five lamps and gas generator; only $850 if taken at once. J. Lehan, Box 17, Stoughton, Mass.

WHITE STEAMER, 1905 model, repainted, cape top, gas lamps, generator, great bargain. C. P. Warner (Darlee Ullmann's), 1220 Michigan Ave., Chicago, Ill.

FOR SALE
IMPORTED MERCEDES CAR

In perfect condition; almost new; 18-22 horse-power; seats four. Landaulet, tools, lamps, etc. Owner going abroad. Car cost over $10,000. Sell at reasonable price. C. J. Ross, 280 Fourth Ave., New York City.

LOCOMOBILE, bought last June, run about 500 miles. Bought new. 18-inch bodies, "Whitney engine," detachable tires, in A1 shape, top; steam. G. O. Gridley, Windsor, Vt., U. S. A.

SIDE entrance tonneau with double cylinder opposed motor, 1905 model. Car is in fair condition and a bargain at $600. Manufacturers' Motor Car Co., 54-56 West 43d St., New York City.

PACKARDS, Wintons, Franklins, Fords, Pierce, Autocars and Cadillacs. Low prices, good condition. Centaur Motor Co., Buffalo, N. Y.

AUTOMOBILE BARGAINS

WE are the LARGEST dealers of NEW and SECOND hand automobiles in the world. Complete bargain sheets sent upon request.

¶ We have a special offer of 5 BRAND NEW OLDSMOBILES French Touring runabouts 1905 models, Price $540.00.

¶ We have 6 BRAND NEW 1905 20 h. p. 2-cylinder OLDSMOBILE side entrance touring cars absolutely BRAND NEW, price $850.00. These machines were shipped for export, and through the failure of the Importer to fulfil his contract we came in possession of these, and we are offering them at the remarkably low prices named above. These, no doubt, are the greatest bargains ever offered to the American public. If interested, write your order. Remember these are BRAND NEW and will only last a few days.

¶ We have every make of automobile there is on the market of standard reputable make. Every machine sold by us is in first-class condition, and guaranteed to be exactly as represented or your money refunded.

¶ No matter what you are looking for, write us and you are sure to find it here and at a price way below any other dealer in the country.

¶ Remember, WE are the LARGEST dealers in the world and carry in stock from 200 to 300 on hand at all times, of various makes.

Complete bargain sheet sent on request

TIMES SQUARE AUTOMOBILE COMPANY
164 West 46th Street 2 doors East of Broadway **New York City**

FOR SALE.—A $1,500 touring car for $500; double front steering, selective engine, 3-speed sliding transmission, double chain drive; carries five; color, red; tires, 30x3½, nearly new; lamps. Also an Oldsmobile runabout for $200, high grade; Fowler motorcycle, $50; Mitchell motorcycle, $75; Indian, $100. Knight Auto Co., 211 No. 12th St., St. Louis, Mo.

CADILLAC, Model B, 8 H.P., 1 cyl.; extras, 1 shoe, 3 tubes, baskets, oil lamps, horn, tools, aprons, etc.; in good running order, $450. W. Wilkinson, 546 Bergen Ave., Jersey City, N. J.

CADILLAC, 1904, touring car, fully equipped, acetylene lens headlight; front tires, 32x3½; glass wind shield. Price, $550. South Side Auto Co., 2339 S. Grand Ave., St. Louis, Mo.

GRUCT (steam), 1903, side entrance, 2 cyl., 12 H.P., regular equipment, ran about 1,200 miles. Tires and car in good shape. Will sell for $750. L. I. Mathews, 1013 Harrison Building, Philadelphia, Pa.

AN established automobile business in Buffalo, N. Y., can use the services of an active young man as assistant manager; an energetic, capable man with $2,500 to invest in capital stock of company now forming, can secure good position with reputable concern. Address Automobile, Box 1, care of Motor.

LOCOMOBILE, steam runabout, 1902 model, 6 H.P., 2 cylinder, newly painted, good running condition; will sell or exchange for larger car. J. E. Reid, Rochester, Minnesota.

NATIONAL, 1904, touring car, fully equipped, new tires, perfect running order. Price, $800. South Side Auto Co., 2339 S. Grand Ave., St. Louis, Mo.

ONE 10-passenger wagonette for sale at a bargain. A. H. Todd, Griffins Corner, N. Y.

OLDS RUNABOUT, 1903 model; very good condition, recently overhauled. Will take $300 if offered spot cash! Address Best, Box 119, care of Motor.

OLDS, 1905 touring car, 10 H.P., 2d condition, having been used on paved streets. Address L. W. Hudkins, Shreveport, La.

OLDSMOBILE RUNABOUT, just been overhauled and completely remodeled; 1903 model, but has never been used very much. Will sell for $200 cash. Address C. J. Blenner, 58 West 57th St., N. Y. City.

POPE-TOLEDO, 1903, 2-cyl. touring car, fully equipped, new Goodrich tires; extra tubes. Price, $300. South Side Auto Co., 2339 S. Grand Ave., St. Louis, Mo.

RUNYEN touring car for sale, 12 H.P., fine condition, run only 1,840 miles, $425; light touring car, $260. Opposed cyl. motor, 12 H.P., $80. Ford car, $450. Bike Motor, $8. Automobile, P. O. Box 223, Ridgeville, Ind.

FOR SALE.—'05 White, complete lamp equipment, cape top, odometer. This machine is as good as new; been run only 2,493¾ miles. Geo. J. Donahue, cor. Main & Market Sts., Campello (Brockton), Mass.

PACKARD FOR SALE

1905 machine, little used; has regular open Packard body, also handsome coupe body made by Rothschild, of Paris. Everything in good order.

Address, "TWO BODIES"
Care of MOTOR

WINTON phaeton in good order for sale, or will trade. What have you? Garfield Park Auto Station, 1474 Madison St., Chicago, Ill.

BUICK, 1905 model, 22 H. P., purchased in August, 1905. As condition. Will guarantee. Cost with extras, $1,250. Price $1,000. Have ordered same make 4 cyl. F. L. Johnson, Concord, N. H.

For advertisements received too late for classification see the last five advertising pages.

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WHITE STEAMER, 1904 model, with cape top, lamps, baskets and 6 extra inner tubes in excellent condition; 2 new tires; machine used but little. Will sell for $1,100. Address A. F. Parkes, Box 354, Nashville, Tenn.

MODEL C WINTON (1905), 16-20 H.P. Fine condition. Price attractive. Reason for selling, owner now using 1906 Winton Model K. Address Winton, Box 19, care of Motor.

1905 WINTON MODEL B, 24-30 H.P. First-class condition. Owner has bought Winton Model K, and will sell B at low price on quick sale. Address P. P. S., Box 123, care of Motor.

CADILLAC, Model A, 1905, hood and radiator, dark green body, red running gear. $385. Address R. L. V., Box 215, care of Motor.

PANHARD, 24H.P. Chassis. Never been run. Immediate delivery. No premium. Address C. T. B, 470 East 17th St., Brooklyn, N. Y.

1905 LOCOMOBILE, 15-20 touring car; in perfect mechanical condition; has had the best of care and never ran better than at present. Sold because owner is buying new machine. Address Walter T. Wallace, 246 Ridgewood Road, South Orange, N. J.

A MODEL "F" CADILLAC, 4 cyl., full equipment, including top; a splendid bargain for an early purchaser. Address N. E. K., Box 89, care of Motor. Can be seen in New York City.

WANT TO SELL 18 INCH LOCOMOBILE BOILER, almost new. Cheap. W. Dennison, 114 N. Front St., Camden, N. J.

PANHARD, 24 H.P., 1904 model, perfect condition; price reasonable. Address E. C., Room 81, 140 West 42nd St., N. Y. City.

MODEL "F" CADILLAC, complete with lamps, horn and searchlight. $700. Address S. S., Box 104, care of Motor.

Second-Hand Cars Wanted

Under this heading wants of second-hand cars for cash or exchange are inserted at the rate of five cents a word. Since Motor is read by all dealers in second-hand cars as well as by more private car owners than any other motoring paper, a "Motor Messenger" in this column is more certain to obtain for you just the car you want than any other kind of advertising.

AUTOMOBILES bought, sold and exchanged. Send for our illustrated bargain sheet of new and second-hand cars at bargain house prices. Greer Motor Car Co., 1410 Michigan Ave., Chicago, Ill.

WANTED,—1905 Model E, 20 H.P. Locomobile, or a Stevens Duryea touring car. Address H. J. W., 24 Argyle Place, Cortland, N. Y.

WANT to sell your auto? Write us. Want to buy one or supplies? Write us. Hartman & Co., Nashua, N. H.

WANTED, 18 or 24 H. P. Panhard 1904 or 1905 model, in good condition; not particular as to appearance; will pay spot cash for the right car. Address, C. T. B., 470 East 17th St., Brooklyn, N. Y.

WILL exchange, for a good steam commercial wagon or passenger truck or car; a Conrad; best of condition; many extras. For further particulars address J. D. Greb, Emsley, Ala.

WANTED TO EXCHANGE, new canopy top. Surreys for an automobile. Address W. W. Emley & Co., Asbury Park, N. J.

CANOPY top, glass front for runabout; also connecting top, forks, tires and tubing for 1 horse power motor cycle. B. F. Conner, 56 Berkman St., New York City.

WANTED.—A Baker electric in good condition, 1905 model, at a bargain. Address Jesse Shoup, The Roland, Washington, D. C.

WANTED,—Franklin runabout, 4 cyl., 1904 or '05 model, must be in good condition; state equipment and lowest price for cash. Riley Shoe Co., P. C. Barger, Columbus, Ohio.

WANTED a 1905 Franklin "F," "B" or "E" or a 1905 Orient light touring car, 16 H.P. Address L. D. Wooster, Westhampton Beach, L. I., N. Y.

Cars for Rent

Under this heading advertisements of motor cars and motor boats for hire are inserted at the rate of five cents a word. Since the motorist having a car for rent should keep a "Motor Messenger" running in this column, Motor is the only motoring paper published that has any large circulation among that portion of the general public that does not own motor cars.

BUTTON MOTOR COMPANY.
AUTOMOBILE rental service; four-cylinder touring cars exclusively; garage and salesrooms. M. D. Button, president; Frederick A. Tanner, treasurer; James H. Scott, superintendent. Phone 2052 38th St. Address 110 West 41st St. New York City.

TO RING CAR FOR RENT.—Large private car by the hour, day or trip. James L. Magee, 1265 Broadway, Times Square, New York. 'Phone 1724 38th St.

AUTOS FOR RENT.—Day, hour or trip. M. J. Venet, 134 West 43d St., New York, or 'Phone 6782 38th St.

FOR RENT.—Fine new Jackson cars. The Jackson Agency, 143 West 29th St., New York.

THE swellest autos to hire in New York are the new 4-four-cylinder Packard touring cars. Private tours anywhere. Leave to the select trade of New York. F. Lautebach, 1488 Broadway. 'Phone 2568 38th St., New York City.

Situations Wanted

Chauffeurs desiring positions can do no better than to let the fact be known by a "Motor Messenger" in this column at the rate of five cents a word.

A young man, machinist, with practical and technical knowledge of automobiles, desires position as chauffeur with good private party. Good references. Address Machinist, Box 22, care of Motor.

CHAUFFEUR having worked three years in auto laboratory and repair shops, wishes position on a touring or domestic car; wages $100; city or country. Licensed in New York. Speaks no languages. Victor Artasie, 162 Jane St., West Hoboken, N. J.

CHAUFFEUR, aged 25, experienced; understands all kinds of machines; best of references. J. Iasana, 69 East Houston St., New York City.

CHAUFFEUR, 23 years' experience; German, married, wishes position as chauffeur; city or country; references. Lee Pulasky, Locust St. and East 151st St., Brooklyn, N. Y.

CHAUFFEUR, experienced machinist, garage experience on any car, including White steamer; best of references; city or country. A. Morris, 2135 Broadway, New York City.

CHAUFFEUR and repairman wishes position with manufacturer or private family; will take position anywhere; age 24. Bender, 452 West 52nd St., New York City.

SALESMAN, 3 years success, 2 years manager State agencies, mechanical engineer, electrical experienced in driving, demonstrating, selling and expert repairing. P. M., Motor Office.

SWEDE, excellent references as coachman and gardener, is now a chauffeur and will come to any one at a reasonable salary; can run gasoline car; speaks Swedish, Danish and Norwegian. L. Lungrey, care of Anderson, 74 W. 11th St., New York City.

TWO years garage and two years demonstrating; knows electrics and gasolene cars. Also good salesman, doesn't smoke nor drink. Address A. M. 306, Motor.

YOUNG AMERICAN, of good family, wishes position on any gasolene car; good references as to character and ability; wages, $18 per week; city or country. Address G. P., care of Motor.

ACCOUNTANT, cashier and office manager, with a fine record for ability and integrity of security as years behind him, desires a change; is anxious for position of responsibility with an automobile firm. Address M. W. E., Box 19, care of Motor.

AUTOMOBILE owners desiring experienced men will be supplied with a selected list and full information by sending $1 to the Chauffeurs' Registration Bureau, 1780 Broadway, New York City.

EXPERIENCED factory manager and superintendent of automobile factory is open for engagement; if you will state fully your proposition will be pleased to "deliver the goods." Address "Energy," care of Motor.

ENERGETIC young man of good address, technical education and practical experience in designing room of large company, wishes good opening in selling department of responsible automobile manufacturer or agency; thoroughly familiar with motors; a licensed driver and in earnest. Address "Steel," care of Motor.

WANTED.—Position in Florida or any other winter resort, as demonstrator, chauffeur or mechanic; 2 years' experience on all kinds of gasolene engines; first class references as to ability and character. Chas. Wooster, Westhampton Beach, L. I., N. Y.

Professional Chauffeurs' Club of America
(INCORPORATED.)

If you are in need of a competent Chauffeur, kindly notify us by mail or 'phone and we will gladly supply some without charge to either party.

'Phone 2498 Columbus 1775 Broadway, New York City

SALESMAN, with excellent practical knowledge of gasolene automobiles, wants position; good references from first-class firm. Address "Salesman," care of Motor.

YOUNG AMERICAN, 26, can run C. G. V., De Dietrich, Peerless and others, wants position as chauffeur; careful driver. E. A. S., 229 West 45th St., New York City. 'Phone, 246 Bryant.

YOUNG MAN, experienced as chauffeur wishes position. Address Dermody, Witham, Mass.

AUTOMOBILE TRADE.
YOUNG MAN, with several years' practical experience to salesman, best knowledge of French and German cars and accessories, desires position with first-class concern; satisfactory references upon request. Erik J. F. Feil, 317 West 114th St., New York City.

A AMERICAN, 21 years of age, six months' experience on road and in shop, wishes position with private party or business house anywhere; gasoline and electric machines. F. J. Dinkin, 647 Tenth Ave., New York City.

LICENSED chauffeur, with best of references from last employer, desires position with private family; willing to leave city. E. Rudiger, 232 East 26th St., New York City.

CHAUFFEUR, 25, licensed, desires situation with private family or in a shop, anywhere; good references. Address E. Lentzner, 315 Central Ave., Jersey City, N. J.

CHAUFFEUR desires position with private family. References as to ability and careful driving; machinist by trade; can build all engines; have had experience in Auto Salesroom and station; can run any make of gasolene automobile; willing to travel if necessary. Frank Ekuin, care of J. P. Johnson, P. O. Box 511, Orlando, Fla.

CHAUFFEUR AND MACHINIST, six years' experience; worked in Mercedes factory and helped build their racing cars; can make and repair any horns; three months in this country; wages per week $20.00, month $80. Address A. K., care of Motor.

REFERENCES have been given to me by the best touring cars in the automobile industry. One well-known man says concerning me, "I know personally that Mr. A. L. qualifications are of the highest quality." Want a position as driver. Address "Worker," Box 17, care of Motor.

Motor Car Supplies and Accessories

Under this heading are advertised, at the rate of five cents a word, all kinds of motor supplies, parts and accessories. Motor is more widely read by car owners than any other motoring paper, and is therefore the best medium in which to advertise motor car supplies.

HOLLY ENGINE, 4 H.P. radiator; Longemeure carburetor, Motsinger pump, Brown & Lipe steering gear; body; running gear; wood wheels; Raymond brake levers; mud guards, seats and other small parts, $125. Geo. E. Dunn, New Philadelphia, Ohio.

ON account of changing wheel base, we have three side entrance tonneau bodies for sale cheap, painted and upholstered. The Oscar Lear Automobile Co., Columbus, Ohio.

WHITE FLASH BOILERS, with water regulator and thermostats, $60 each. 14 in. and 18-in. Lotz and Tonkins boilers, second hand. Portland Garage, Portland, Me.

IF you are having trouble with your radiator, write for our catalogue and booklet, "Radiator Facts," giving quick delivery. Fedders Manufacturing Works, Buffalo, N. Y.

HONEYCOMB radiators, mud guards, hoods, tanks, aluminum braizing, sprocket covers, repairing of all kinds. A.Z Co., 42 Eleventh Ave., New York, Call or 'phone 2294 38th St.

FOR SALE.—Two Swinehart tires almost new. 32x3 in., $20 for each; our new Splitdorf dash coil; one new glass front, large canopy top, $85. George Auto Co., George, Iowa.

SHEET METAL SUPPLIES. Specialties. Feddens Manufacturing Works, Buffalo, N. Y.

STORAGE and repairing of all descriptions; best equipped station in Eastern New York. Utica Auto Station, 57 Elizabeth Street; 22 West Utica St., corner of Main, Buffalo, N. Y.

W. H. SHARPE,
VULCANIZING all kinds of tires and rubber goods repaired; auto tires recovered; old tires bought. 118 West Broadway, New York.

AUTO TIRES AT HALF PRICE.
WRITE TO-DAY.
THE KANSAS
159 Church St. New York.

PROTECT YOUR AUTOMOBILE WITH A MUD APRON. A.Z Co., 462 Eleventh Ave., New York N. Y. 'Phone 2294 38th St. Send postal for blotter giving full information.

ROAD MAPS.
Of New York, New Jersey and New England by districts; all roads and points of interest shown; automobile route cards and guide books free. Geo. H. Walker & Co., 201 High St., Boston, Mass

LOOK HERE.
If you want a good auto tire, I carry the best, and have the largest stock in New York. All sizes at prices that will interest you. VULCANIZING. All makes and sizes of tires repaired and recovered. GUARANTEE PUNCTURE REPAIR. Write for prices. H. W. M. SHARPE, 118 West Broadway, near Duane St., New York City.

MANHATTAN BRAZING WORKS.
CAST IRON BRAZING. We make a specialty of brazing cylinders, gears and miscellaneous parts of every description and all other metals. WE ABSOLUTELY GUARANTEE THE WORK WE DO. 172 Reade St., cor. West Broadway, New York. Tel. 3010 Franklin.

EAGLE TIRE REPAIR CO. Steam vulcanizing, recovering and repairing for foreign and domestic shoes and tubes. Dealers in new and re-covered shoes. Selling agent for J.E. GAULOIS Tires. ALL REPAIRS GUARANTEED. Offices, 1605 Broadway, near 53d St., New York. Factory, 266 Washington St. 'Phone, 2899 Columbus.

SOMETHING DIFFERENT.
In lamps, both oil and gas. Handsomest lamp on the market, price reasonable. Designed by one who has used the other kinds.
AUTOMOBILE BROKERAGE CO.,
140 West 42nd St., N. Y. City.

For advertisements received too late for classification see the last five advertising pages.

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Help Wanted

Since all the best chauffeurs are regular readers of Motor, a "Motor Messenger" at five cents a word is the surest means of obtaining a satisfactory chauffeur.

AN established automobile business in Buffalo, N. Y., can use the services of an active young man as assistant manager. An energetic, capable man with $2,500 to invest in capital stock of company now forming, can secure good position with responsible associates. Address "Automobile," Box 11, care of MOTOR.

THE CHAUFFEURS' REGISTRATION BUREAU offers the only opportunity by which experienced chauffeurs are placed in communication with automobile owners; registration fee $2, including advertisement in Motor; no further charge; send stamp for registration blank and further information to CHAUFFEURS' REGISTRATION BUREAU, 1269 Broadway, New York City.

WANTED.—Good mechanic, who has had experience, to superintend our repair department; must be well recommended and competent to take charge of the repair work. Address, with reference, Fort Worth Auto Co., Fort Worth, Texas.

Miscellaneous Announcements

Under this heading we are prepared to print "Motor Messengers" for other than trade advertisers who have a real message to deliver to motor car and motor boat owners and users. The charge is only five cents a word.

AUTOMOBILE REPAIRING.—Consult the Auto Mart before installing your automobile line; perhaps we can save you money; repairing of every description; guest cutting a specialty. The Auto Mart, 327th St. and 7th Ave. 'Phone, 4,062—38th.

GRINDING SKATES is profitable during the winter months. Is easy with one of the Holdrex Grinders; any size skates, on or off shoes; price $5. C. P. Acharsias, Eagle Hall Block, Asbury Park, N. J.

FOR SALE.—Fine, modern shop, approximately 60 M. square feet, equipped with up-to-date machinery, admirably adapted for the manufacture of automobiles and parts. Excellent location in thriving Indiana city of 20,000; unrestricted shipping facilities, 4 new trunk lines; labor first class and moderate in price; no strikes; Gas-city two hundred men. Will consider cash or terms. Send for full particulars, Box 816, care of Motor.

REPAIR shop for autos and carriages, situated in the heart of the auto and carriage district in New York City, 150 feet from Broadway, 50 feet from Subway station; well sell with stock, tools, an elegant elevator; two-year lease, which can be extended and now doing prosperous business. Address "Lincoln," care Motor.

BUSINESS FOR SALE.—In order that I may give to all my attention to the manufacture of my goods and specialties, I will sell my local automobile, bicycle and phonograph business, which is the oldest, largest and best equipped; good agencies and help and located on principal street in the heart of the city. Expensive light and business the best. No other garage in city, population 20,000, and 31 autos. A. S. Noonan, James St., Rome, New York.

AN established New York firm of ample capital and large selling ability, owning and operating the most completely equipped fire-proof garage in the United States, will consider proposition for the agency in this locality of a foreign and also a high-grade American car. This is an exceptional opportunity for live proper parties. Address Howard, care of George Batten Co., Potter Building, New York, for full particulars.

E. C. CHURCH,
149 West 42d St.,
New York City.
Automobile Expert.
Dealer in high-grade second-hand cars.
'Phone, 3401 Bryant.

Instruction

Under this heading are inserted, at the rate of five cents a word, all advertisements of resident and corresponding automobile and motor boat schools, as well as notices of motoring books and other publications.

MANHATTAN AUTOMOBILE SCHOOL.—Instruction by experienced teachers who are mechanical engineers with N. E. degree. Darrell Higgins, Principal, 315-321 W. 96th St., New York. 'Phone 1650 Riverside.

AUTOMOBILE INSTRUCTION. — Only practical school of automobile instruction in America; you to become an experienced chauffeur with full knowledge of how to keep your machine in order. Thorough practical work only. Thelen's School of Automobile Instruction, 418 West 37th St., New York City (near 10th Ave.). 'Phone 3061 38th St.

SCHOOL FOR CHAUFFEURS.—Ours is the original school of automobile instruction. Our unparalleled success has made many imitators. By careful, thorough individual work under personal supervision of the manager we make every student not only an expert chauffeur, but a thoroughly competent mechanic able to make repairs on any machine and to keep it at all times in perfect order. Satisfaction guaranteed. Positions waiting. West Side Automobile Transportation School, 309 West 41st St., New York, N. Y.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERS, INC., 128 WEST FIFTY-SIXTH STREET, NEW YORK CITY.

THOROUGH INVESTIGATION—which is invited—will prove this the only high-grade, completely equipped school for automobile instruction. Curriculum under personal direction of Prof. Chas. E. Lucke, M.E., Ph.D., School of Engineering, Columbia University. Departments include Machine Tool and Forge Shops, Assembling and Test Shops, with every type of motors also Laboratories specially equipped to teach all component parts of automobiles. Ability of graduates assured. Day and evening classes. Special courses for owners.

Garages

Under this heading notices of storage, repairing, electric charging, etc., are received from garages at the rate of five cents a word. A "Motor Messenger" in this column will bring your garage to the attention of more motor-car owners than any other publication.

HICKS AUTOMOBILE COMPANY,
1384 BEDFORD AVE., BROOKLYN, N. Y.
AGENTS FOR
REO MOTOR CARS.

YOU AUTO
more with us; new station, low rates, best service; machine and electric work. Knickerbocker, 223-5 West 64th St., New York City.

THE WITHERBEE IGNITER CO. begs to inform the public of change in address to No. 541 West 43d St., New York City.

Open for Business.
THE PEACE
AUTOMOBILE AND MACHINE CO., Inc.,
208-210-212 West 124th St.
AT SEVENTH AVE. PRIVATE
'Phone 4844-4845 Morningside NEW YORK

AUTOMOBILES STORED FOR THE WINTER
AT REASONABLE RATES
AMERICAN STORAGE WAREHOUSE COMPANY
DEAD STORAGE ONLY.
806 West 45th Street.
'Phone 4122 38th St. New York City

WANT to buy, sell, exchange? All makes and models almost now. Manhattan Storage Co., 334 West 44th St., New York City.

CARS stored and repaired at lowest reasonable prices. Terms: By the job or by the hour. All work guaranteed. Auto Transportation Co., 309 West 41st St., New York City.

MANUFACTURERS' MOTOR CAR CO.—Sales, storage, repairs, supplies. 54 and 56 West 43d St., New York City.

PROSPECT PARK AUTOMOBILE CO.—Largest and most complete fireproof building in Brooklyn. 918 and 920 Union St. Near Prospect.

ELECTRIC supplies. Witherbee Igniter Co., 541 West 43d St., New York City.

WE have opened a Sub-Agency for the Jackson cars in the upper Harlem automobile district. The Jackson Agency, 1655 Broadway, near 52d St.

PASTRES' AUTOMOBILE GARAGE, corner of Ocean Parkway and Sheepshead Bay, opposite Bader's Hotel. Telephone 831 B South. Branch at 119 Sixth Ave., corner of 11th St. Telephone 831 B South, Brooklyn.

UTICA AUTO STATION, 82-24 W. Utica St., Buffalo, N. Y. Official Station American Motor League, fully equipped garage, charging, machine shop. St. Louis Agency.

AUTOMACHINE CO., 48 Westfield Ave., Elizabeth, N. J., agents for Peerless Runabouts. Best equipped repair shop and garage in Elizabeth.

Agents

Under this heading will be accepted advertisements of agents of the various makes of cars. Also descriptions of new cars for sale; notices of agents, salesmen, etc. This will be a very useful guide to out-of-town owners when making trips into town. Advertisements will be accepted at the rate of five cents a word.

PIERCE RACINE
two cylinder touring car,
1905 R. 28hp.
four cylinder touring car,
1906 R. P. 32, $1,700.
GANTERT & PAUL, AGENTS.
'Phone, 3725—Harlem. 60, 62 West 116th st.

A LEADING foreign manufacturer of Automobiles desires to arrange with an American company to reproduce his models in the United States. Complete samples can be supplied, also full sets of blue prints of every part. His line consists of two up-to-date models as follows: Two cylinder 16 H. P., four-cylinder vertical 24 H. P. Any parties in the position to interest a strong company in the manufacture of these models in the United States, please address C. C. M. C., Box 125, care of Motor.

For Exchange

A new Department sure to produce results. Every motorist has surplus accessories. Exchange them for something useful. Five cents a word.

FOR SALE.—5 x 7 camera, Pony Premo No. 6; has Voightlaender Collinear Lens with Iris shutters and diaphragms. Portland Garage, Portland, Me.

WILL EXCHANGE for a good steam commercial wagon, a passenger truck or car; a Conrad; best of condition; new tires. For further particulars, address J. D. Greb, Ensley, Ala.

GARAGE OWNERS—NOTICE!
Garage and general storage and repair shop near Broadway, New York City, full equipped with tools and necessary machinery for the repairing of automobiles, carriages, etc., now doing a prosperous business—has elevator and other handy appliances—two stories and a cellar. Will EXCHANGE for dividend-paying stock in large concern. Reason for selling, have no time to run same as I am conducting another business. For full particulars, apply to Columbus, Box 19, care of Motor.

Advertisements received too late for proper classification

SECOND-HAND CARS FOR SALE

1905 MODEL 6-C Oldsmobile, run 1,200 miles; does not do; Odometer, tube-horn lamps, brand new engine, never used; a bargain at $400. Guy C. Jones, Carthage, New York.

LOCOMOBILE, 1905, Type E, 15-20 H. P., canopy and cape top, Jones speed and odometer, New Continental horn on front, Lamps, tools and extra parts. Cost, with extras, $3,300. Will sell for $2,200, f. o. b. Philadelphia. Speed 40 miles per hour. Condition perfect. L. V. Clark, Harrison Building, Philadelphia.

FOR SALE—Cadillac, 10 H. P. tonneau, royal blue, straw striping, yellow running gear, bought September 14, 1905; run about 400 miles, in perfect condition; tires do not show wear; only object in selling, bought larger 1906 Cadillac. Full complement of tools. $25. Nevervout mirror lens searchlight and generator. A snap. Address Black, Box 29, care Motor.

FOR SALE—1905 Thomas Apperson, two-passenger model 1904, 15 H. P., acetylinder engine, with surrey seat attachment, in first-class condition. Write for price and terms. St. S. Polk, Bryan, Ohio.

FOR SALE—Peerless, acetylinder, 16 H. P., fine condition, tires new, extra shoe. Fifty miles demonstration, got another car; owner has no use for this. Price, $700. J. F. Twombly, 34 Green St., Brockline, Mass.

FOR SALE—Oldsmobile, touring runabout, used 300 miles; guaranteed perfect; $800; one new one, $550. Wichita Automobile Co., Wichita, Kan.

FOR SALE.—Oldsmobile, curved dash, 1906 model; new; blue with yellow gears; two in standard black. Wichita Automobile Co., Wichita, Kan.

WHITE STEAMER, 1904 model, 15 H. P., a cyclinder, extras, lamps, rodometer, etc., newly painted and in perfect condition. Will sell for $1,000. Address Box 135, Station C, Cleveland, Ohio.

SECOND-HAND CARS WANTED

WANTED.—Franklin light tonneau car; must be in good condition; 1904 or 1905 model. Full particulars and lowest cash price in first letter, C. B. Tiernan, La Grangeville, N. Y.

SITUATIONS WANTED

YOUNG Frenchman, well educated, speaking English, desires an office position in an import or export house. Preferably in the automobile line. New York City. At present employed as a bookkeeper, but would prefer a position out right away. Would start if possible. Can furnish bond if required and the best of references from my present employers and from former. Address with full particulars, Francais, Box 12, care Motor.

YOUNG licensed chauffeur desires position on gasoline car; Pope-Toledo or Peerless preferred. Temperate habits, trustworthy and honest; would also act as private secretary. Irving R. Kinney, Mariner's Harbor, N. Y.

GERMAN-AMERICAN, five years on gasoline cars, wishes position in New York or New Jersey; good references; $25 per week. Wm. Kuppe, 158 Wallabout Street, Brooklyn, N. Y.

YOUNG man wishes position as driver and repairman. Four years' experience. Good references. Foreign and American cars. M. Mostowitz, 321 Henderson St., Jersey City, N. J.

Hotels

As hundreds of motorists are readers of Motor, Hotels that cater to such people can do no better than insert a notice in this column at five cents per word.

HOTEL GRAMATAN, Lawrence Park, Bronxville, N. Y. Opened June 1 and will remain open all the year. Most palatial hotel near New York: 11 miles from Grand Central Station; golf, tennis, riding, driving, etc.; refined, quiet, exclusive; cuisine, and fine orchestra; long-distance telephone in every room; booklet. J. J. Tomlin Co., proprietors; also proprietors Garden City Hotel, Long Island.

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THE LATEST TYPE OF

LOZIER MOTOR CAR

AND OUR BRAND NEW BUILDING TO SHOW IT IN

¶ If the satisfied customer is the best advertisement, the LOZIER MOTOR CAR enjoys a most unique position. *Every customer is a satisfied customer*, and the fact that each is, in addition, an owner with large automobile experience, makes his expression of satisfaction with THE LOZIER MOTOR CAR an advertisement of the VERY BEST. Ask one of them—and then see our line of Limousines, Landaulets and Touring Cars. ¶ The Lozier Motor Car is a high-grade product with years of Motor-building experience back of it—the name "LOZIER" being a guarantee of all that is best in high-class construction. ¶ Our new 1906 MODEL, TYPE D, 40 H. P. TOURING CAR is shown above, and it is a most beautiful car. The price is $5,500 and among its features of construction may be mentioned the long wheel-base, 117 inches; 36-inch wheels; 4—4½-inch tires; 55-inch tread; 10-inch clearance. Platform spring suspension. Weldless I-beam, nickel-steel forged axles. Dust-proof irreversible steering column. Ball-bearing steering knuckles, nickel-steel forgings. Large ball-bearing wheel hubs. Noiseless sliding gear transmission—gear slides of nickel-steel, gears ground to gauge. Self-contained annular ball-bearings throughout. Speeds, selective type—four forward and reverse—one lever for all. Dog-and-ratchet back-stop on differential shaft. Noiseless exhaust. Dust-proof internal expanding emergency hand brakes. Powerful foot brake on differential shaft. High power motor. Annealed pistons. Interchangeable valves and parts. Webbed crank-shafts. Crank-shaft bearings hardened and ground on own centers. Combination bronze and babbitt crank and crank-shaft bearing boxes. High tension magneto. Positive force-feed lubricator. Large radiator. Automatic carburetor with balanced throttle controlled by governor. Speed controls on stationary quadrant at top of steering-wheel. Automatic disengaging cam on starting crank. Self-contained, large face, cone clutch—simple adjustments. Dust-proof aluminum case under motor and entire transmission. Noiseless fiber cam-shaft driving gears. Cottered nuts throughout. Small oilers for chassis springs. Camshafts of crucible steel—cams integral. Nickel-steel clutch shaft—double universal joints. Cylinders bored and ground. Chain adjustments. DESCRIPTIVE CATALOGUE NOW READY. Send for it, or see us at our new headquarters—a handsome four-story and basement structure devoted entirely to the business of The Lozier Motor Company, with their high-grade line of Motor Cars, Motor Boats, and Marine Motors.



55th ST. and BROADWAY, NEW YORK CITY

THE LOZIER MOTOR COMPANY

55th Street and Broadway, New York City

Selling Agents for Wis. and Ills.

Dan B. Southard, 1409 Michigan Ave., Chicago

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The Simplest Engine in the World
The Two-Cycle Elmore

WHEN you understand that the two-cycle Elmore engine does away with 18 to 20 parts on each of the four cylinders, and absolutely eliminates all inlet and exhaust valves with their attendant mechanism, you'll agree with us, won't you, that this is the simplest engine in the world?

Do we need to point out that this also reduces the cost of operation and upkeep to the minimum and makes the Elmore the most economical as well as the simplest of engines in the world?

From whatever standpoint you examine the two-cycle Elmore, equally impressive and sensational features present themselves. The four cylinder car produces approximately as much power as would eight cylinders of the four-cycle type—produces it in a continuous and unbroken application that will carry the car indefinitely on the high speed under any and all road-conditions.



Again—it is the most successful self-starting engine in the world. Again—you can cut out one, two or three cylinders at will, both spark and gasoline. With one cylinder cut out the difference is imperceptible except in speed; with two out—barely noticeable. Do you see the economy of this?

Again—you can throttle the Elmore engine on the high speed down to two miles an hour. Again—the Elmore will take a 16 per cent grade on the high speed with approximately as much ease as it travels on the level road.

It starts with a smooth gliding motion that is delightful; and dips down and over uneven spots with a minimum of jolt or jar.

The four cylinder Elmore at $2500.00 and the three cylinder Elmore at $1500.00 are two cars whose manifold exclusive features demand your most serious consideration. Learn all the wonders of the two-cycle type by getting in touch with the nearest Elmore agent or by writing for our new descriptive catalogue and books of information.

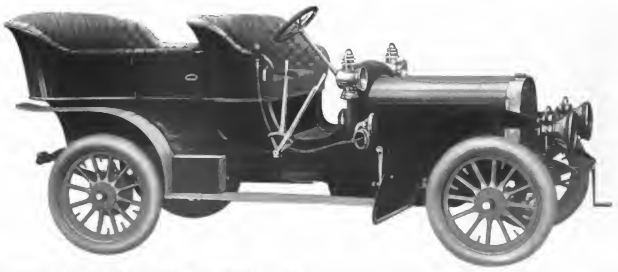
THE ELMORE MFG. CO., 1204 Amanda St., Clyde, Ohio

Members A. L. A. M.

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HAYNES



MODEL "R" FOUR-CYLINDER TOURING CAR ¶ *Vertical roller-bearing engines. Cylinders cast separately, 5¼x6 inches, 50 H. P. An exclusive transmission that absolutely prevents stripping of gears. Positive cooling system. Individual and special lubrication. Master Clutch has metal faces and takes hold without jerking. Shaft drive. Exclusive universal joints that prevent wear on pins. Sprocket and Roller Pinion and perfect Rear Axle, all exclusive. Roller bearings throughout. 108-inch wheel base. 54-inch tonneau, seating five people. Four to 60 miles an hour on high gear. Weight, 2,750 lbs. Price, $3,500, f.o.b. Kokomo. Full equipment.*

MODEL "O" FOUR-CYLINDER TOURING CAR ¶ *Cylinders cast in pairs 4¼x5 inches, 28 to 30 H. P. Transmission, cooling system, lubrication, master clutch, shaft drive, universal joints, sprocket, roller pinion and roller-bearings and body same as on Model "R." 97-inch wheel base. 4-inch tires. Tonneau seating three persons. Four to 40 miles an hour on high speed. Price, $2,250, f.o.b. Kokomo. Full equipment.*

The Car of Many Exclusive Features

The Haynes has many exclusive features that assure for it a wonderfully low maintenance and up-keep expense.

In a 6,000 mile trip, made in early winter, from Kokomo, Ind., to New York and Boston, via Albany, returning over the Allegheny Mountains by the National Road, the repair expense was but $1.50.

Roller-bearings throughout, make the loss of power between the motors and rear tires less than 10 per cent, and account for the ease with which the car went up the longest and steepest grades in crossing the mountains.

The Haynes exclusively has roller-bearing engines; a master-clutch with no wearable surfaces, which takes hold without jerking; a transmission that positively prevents burring and stripping of gears; and a roller pinion and rear axle that overcome every objection to shaft driven cars.

Other exclusive Haynes features are given in our new Catalogue. For prompt attention address Desk 31.

The 1906 Haynes Models will be shown at the New York Madison Square Garden Show, space C-7, and at the Chicago Show, Coliseum, spaces 7 and 8.

"The Car the Repairman Seldom Sees"

HAYNES AUTOMOBILE CO.

Oldest Automobile Manufacturers in America

CHICAGO: 1421 Michigan Ave.

KOKOMO, IND.
Members A. L. A. M.

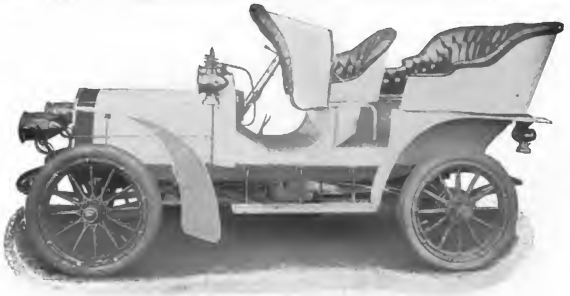
NEW YORK: 1715 Broadway

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The Duquesne

STARTS FROM THE SEAT



THE 1906 DUQUESNE

There is no doubt about it—the DUQUESNE starts from the seat—by a forward pressure on a foot lever. No cranking is necessary. This is a distinct advance in the right direction—the elimination of the back-breaking crank.

That improvement is but a "straw which shows which way the wind blows." The DUQUESNE is a car of the advance kind—the kind that is and keeps ahead in the matter of improvements, serviceability, and all the other qualities which go to make a superb *car for use.*

SPECIFICATIONS:

16-21 H. P. 4 cylinder, 4 cycle vertical motor, air-cooled.

VALVES.—Intake and exhaust mechanically operated, inter changeable. Primary exhaust automatic.

IGNITION.—Jump spark. Dry batteries.

CARBURETOR.—Float feed, spray type, automatic, very efficient.

TRANSMISSION.—Planetary, all spur gears, running in oil.

SUSPENSION.—Three point flexible.

DRIVE SYSTEM.—Direct drive by band gears and Duquesne triangular system.

SPEED.—3—40 miles per hour.

STARTS from the seat with forward pressure on foot pedal.

BODY.—Double side entrance, seats five comfortably.

COLOR.—Optional.

WEIGHT.—1,750 pounds.

BRAKES.—In addition to two powerful expanding brakes on rear wheels that suffice to hold the car anywhere, the rear wheel brake drum, on either side, is fitted with internal out ratchet teeth, that will positively hold the car on any hill, however steep. This is especially desirable in case of accident or should the motor stop for any cause, as it absolutely prevents car from running backwards.

CONTROL.—Spark and throttle lever are arranged on top of steering wheel, but independent of the latter. The gear operating lever is arranged immediately below the wheel; the backward movement of this lever gives the slow speed forward, the forward movement the high speed. The reverse and brakes are operated by foot pedals.

INTERCHANGEABILITY.—Every part that enters into the mechanism of the Duquesne is standard and interchangeable. This is a great convenience, especially regarding repairs, and we are in position to forward repair parts the day order is received—a little big thing.

Price $2,000, with full equipment. Two acetylene lamps, generator, oil side lamps, horn and tail lamp

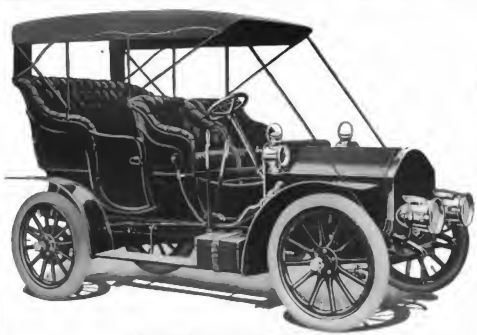
Duquesne Construction Co.

JAMESTOWN, N. Y.

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Waltham Orient



Model R—$2250. Cape Cart Top with Storm Apron, $125

FIVE TOURING CAR MODELS

Model R, 20 H.P., $2250
Five Passenger

Model N, 20 H.P., $2000
Five Passenger

Model M, 16 H.P., $1750
Four Passenger
With Detachable Tonneau

Model L, 16 H.P., $1750
Five Passenger

Model K, 16 H.P., $1600
Two Passenger
A Handsome Runabout

The Waltham-Orients are Air-Cooled Cars

The advantages of air-cooling in cars of certain power-rating are manifest and each advantage is an argument in itself.

1. There is a great reduction in weight, owing to the absence of radiator, water-jackets, pumps and plumbing, and of the water supply itself.
2. This permits lighter proportionate construction throughout, and does not require such large tires, which are more expensive to renew.
3. It reduces wear on the motor and all bearings, cuts down the expense of repairs, replacements and tire bills.
4. It eliminates completely the complicated mechanism of water radiation with its constant tendency to leak.
5. It increases power and speed of the same comparative horse-power proportionate to the decrease in weight.
6. The weight reduction increases the elasticity and responsiveness of the car.
7. Its extreme simplicity and accessibility make it possible for each owner to adjust and tune his own car without assistance from an expert but expensive repairer.
8. A woman can drive it with ease because of the absence of confusing complications of control.
9. It will run 365 days in the year. It matters not if the thermometer registers 40 degrees below zero; there is nothing to freeze.
10. It is equally immaterial if the temperature is one hundred in the shade—the Waltham-Orient system of radiation, assisted by a powerful fan, keeps a uniformly cool engine, entirely free from overheating or pre-ignition. When it is considered that the explosion in the cylinders equals 1,600 degrees Fahrenheit, it is apparent that the ordinary range of external temperature is not an important factor.

ORIENT FRICTION DRIVE BUCKBOARD



A Remarkable Motor Car for $400

The lowest priced Motor Car in the world. 4 H. P. AIR-COOLED Weight, 600 lbs. Gasoline consumption, one gallon to 35 miles. Oil consumption, one pint in 90 miles. Maximum power, 40 to 1. Will climb grades and drive through sand that no other motor car, of any horse power, can negotiate. Speed, 30 miles an hour.

THE BEST SELLING PROPOSITION IN AMERICA

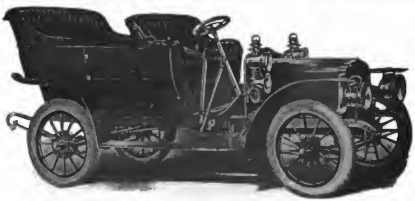
WALTHAM MANUFACTURING COMPANY, GENERAL OFFICES AND FACTORY, **WALTHAM, MASS., U. S. A.**

Responsible dealers desired in unassigned territory. Write for Catalog and Agency Proposition. Members Association Licensed Automobile Manufacturers

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CORBIN



CORBIN CARS for 1906 are made in two models ONLY, a five-passenger light touring car, Model E, of 24 H.P., 100-inch wheel base, weighing 1,800 pounds, $2,000; and a superb two-passenger car Model G, of 24 H.P., 93-inch wheel base, weighing 1,600 pounds, $1,800.

THEIR SALIENT FEATURES ARE:

The Corbin System of Air Cooling---a Vindication of the Air-Cooled Idea.
The Corbin System of Mechanical Valve Operation---All Operating from One Camshaft.
The Corbin Steel Pan Motor and Transmission Support.

New floating bevel gear axle, new I-beam front axle single piece forging, new control, new universal joints, new oiling system, and

ANNULAR BALL BEARINGS THROUGHOUT

These and many other commendable features are combined in

The Corbin Idea for Simplicity, Accessibility, Durability and Safety.

THE

Corbin Motor Vehicle Corporation

MAKERS OF CORBIN AIR-COOLED CARS

NEW BRITAIN, CONN.

1404 Michigan Avenue, Chicago
5905 Centre Avenue, Pittsburg
470 Broad St., Newark, N. J.
Court and Exchange Sts., Rochester, N. Y.
4 West 38th Street, New York
Motor Mart, Park Square, Boston
206 North Broad Street, Philadelphia
115 East 7th Street, Cincinnati

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Northern



Silent Northern Touring Car, 20 h.p., five passengers. Tires 30 x 4. Completely equipped, $1,800, f. o. b., Detroit.

The quietest and easiest riding car in the world, and we will prove it to you. No car is handsomer or more completely and luxuriously equipped.

Its compact mechanism is as remarkable for its efficiency as for its simplicity, and no mechanism yet shown has even approached the Silent Northern in simplicity.

Complete control from the steering column and pedals placed in a convenient position to side levers. The double opposed motor is placed horizontally in front, under the hood, and the entire mechanism is enclosed in the combined crank-case and gear case—completely protected from mud dust and water, yet instantly accessible.

The extra large flywheel with fan-blades cast integral, 24 inches in diameter, insures wonderful steadiness in the motor, and freedom from vibration. This flywheel is placed just behind the radiator, and directly on the crank shaft, and there is only one universal-joint. The importance of this original arrangement will be more thoroughly appreciated when it is understood that power is delivered on a direct line from motor to rear axle without loss.

No belts, chains, gaskets, strut rods, or truss rods. No side levers. No vibration. These features in connection with the four full elliptic springs, four inch tires, and an extra long wheel base—108 inches, guarantee supreme comfort and ease of riding over any road. Our catalogue explains many other novel features of construction, which are intensely interesting to the buyer who desires to secure maximum efficiency and quality



1906 MODELS

Steady Northern Runabout, 7 H.P., with oil lamp equipment $650

Silent Northern Touring Car, 20 H.P., double-opposed motor, with gas and oil lamp equipment $1800

Silent Northern Limousine, 20 H.P., with gas and oil lamp equipment and electric light $2800

Model K, 30 H.P., four-cylinder car, air control and equipped with side-brakes, with gas and oil lamp equipment $3000

NORTHERN MANUFACTURING COMPANY

DETROIT, U. S. A.

Member Association of Licensed Automobile Manufacturers.

New York City Agent: PETER FOGARTY, 142 West 38th St.

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FRAYER MILLER

"THE CAR OF ENDURANCE"

COOLED THROUGH AIR JACKETS



Four Cylinder, 25 H. P., $3,000. Six Cylinder, 40 H. P., $4,000

AN AMERICAN PRODUCT

IMITATION OF NO FOREIGN CAR

THE system of cooling in the Frayer-Miller Car really **marks an epoch** in automobile gas engineering. There is nothing to compare with the **FRAYER-MILLER AIR-COOLING SYSTEM. It is distinctive.**

A Frayer-Miller Car covered more miles in one week than any other type of self-propelled vehicle.

The **Frayer-Miller Car at Long Branch** was driven 3,202 miles in 6 days, 15 hours and 29 minutes, equal to the distance from Golden Gate to Hell Gate.

During the last 1,866 miles of this trip the engine never stopped.

RECORDS FOR DISTANCE AND FOR ENDURANCE.

The Frayer-Miller with its novel and striking air-cooled system is up-to-date and always successful. No water-cooling system would ever be necessary with the Frayer-Miller, or air-cooling system through air jackets possible with other makers. The mud guard arrangement is novel and new

Exhibiting at Chicago Show

Oscar Lear Automobile Co., Columbus, O.

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WELCH

50 Actual Horse Power

A combination of imported steels and "hand" workmanship with American simplicity of design and interchangeability, makes the 1906 Welch a car equalled by none.

Buy a car whose vital points have been in use practically unchanged for several years, and that is being copied much more extensively by prominent makers than any other car in existence.

Buy one that is guaranteed to give better service the second season than the first, and that will not be a back number in six months through the caprice of the maker, a car that will carry you on the DIRECT drive from four to fifty miles, or better, per hour, and take ninety-five per cent. of all hills on the high gear. KNOW what you are buying. Ask for our treatise on Horse Power and our latest catalog.

WELCH MOTOR CAR COMPANY

WELCH-
Motor-Car-Co.
Detroit and
Pontiac Mich.



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THE Rapid MOTOR VEHICLE CO.

"WE DELIVER THE GOODS"

The "RAPID" TRUCK and DELIVERY WAGONS are designed and built solely for commercial purposes.

Each part is made to meet the requirements of Delivery and Trucking Service, consequently our vehicles give infinitely greater service and satisfaction than pleasure car chasses with delivery bodies or remodelled Touring Cars.

Since the Rapid Motor Wagon was first announced nearly two years ago, there has been a flood of orders far exceeding our capacity.

This steadily increasing demand has been due solely to the merits of the car. The "Rapid" is a car for business, built in a business like way.

Owing to this great call for a reliable, trust-worthy delivery car, we have just completed our mammoth new factory, at Pontiac, Mich., and from now we will be prepared to live strictly up to our slogan—**"We deliver the goods."**

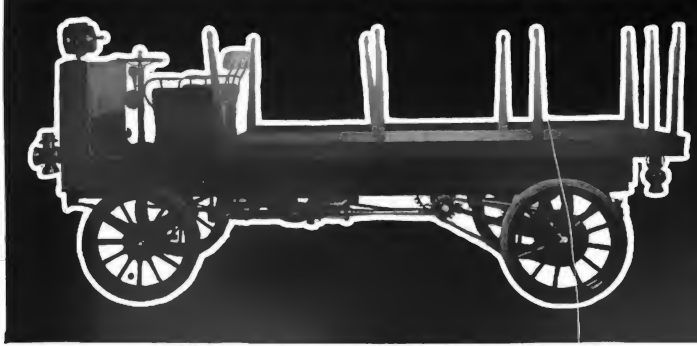
PRICES: One-ton wagon, $1400; 1 1-2 tons, $1800.

Every car fully guaranteed for one year

The illustration shows only one of our many styles of bodies. Size and style you require will be furnished. For full information about our cars, write

C. N. HENRY, Sales Manager

RAPID MOTOR VEHICLE COMPANY, Pontiac, Michigan



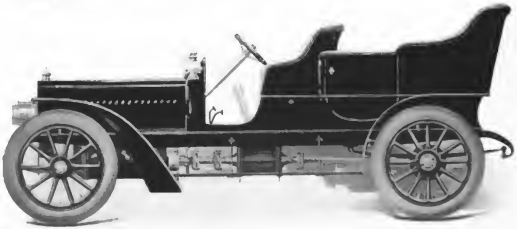
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HARRISON

A SENSATION

will be created at the Chicago Automobile Show, February 3d to 10th, when the HARRISON AUTOMOBILE makes its appearance, because we have designed, perfected (and patented in this country and in foreign countries) A SELF-STARTING DEVICE that is positive in its operation.



One of the things about a motor car that we all dislike is "cranking." We all dislike to work more than is necessary, and "cranking" is work. Whether you do it or your Chauffeur does it, it is work, just the same. It is vexatious and it is undignified.

Sometimes an engine starts readily—one jerk of the crank is sufficient. Next time it may take more work. You may have to "crank" three or four times. And then again, we have all heard of cases where it has taken more work even than that.

The *Harrison* has *a self-starting device*. One does not have to crank a *Harrison motor car*. A *little knob* is turned and the *switch* thrown on, and *the engine starts*. All this is done *while sitting in the seat*. Don't have to get out.

And, it is *positive—It starts*. It starts every time. It starts on a cold morning as well as on a warm day. A *Harrison car* can stand idle for an hour, or a day, or a week, a month, a year, and you will not have to crank it.

We do not depend on compression to start with. Our compression is as near perfect as modern tools can make it. The efficiency of a motor is largely due to compression. But, as Kipling says, "That is another story." We have it, of course, but we don't need it to start the motor with. Nor do we use springs and such contrivances. We have our letters patent for this device. It has them all beat. See a *Harrison car* and you will say so. Think of the convenience! Think of the trouble it saves!

Complete details of our 1906 model will be sent on request.

Look for the *Harrison* when you visit the Chicago Show.

PRICE—$2,200.
BODY—Side door.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—On rear wheels, internal.
TIRES—32 x 4.
CYLINDERS—4, in pairs, vertical, tandem.
COOLING—Water, gear pump.
IGNITION—Jump spark, storage battery, magneto optional, extra.
TRANSMISSION—Selective type, sliding gear
SPEEDS—3, foward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—107 inches.
TREAD—56 inches.
WEIGHT—1,600 pounds.

HARRISON WAGON CO.

Grand Rapids, Mich.

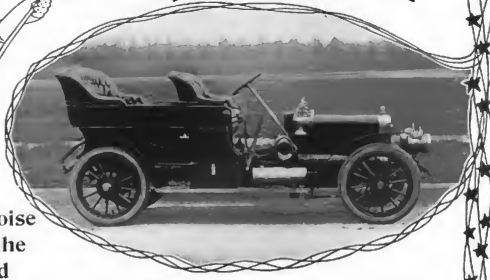
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THE AMERICAN



A NEW STAR IN THE FIRMAMENT



No Noise but the Wind

THE PRICE

of the American Car is consistent with the design, material and workmanship that enters into its construction. Every part is designed and constructed with the relation that it has to do with every other part.

¶ All our energies have been devoted to developing and perfecting *one* type of car, and we are justified in asserting that there is *not* a more practical and reliable automobile manufactured in this or any foreign country.

¶ The American Car will be on exhibition at the Chicago Automobile Show, Feb. 3-10th, and we shall have pleasure in demonstrating the American for the benefit of any and all who are thinking of purchasing a high-grade automobile.

¶ Perfect simplicity in construction and mode of operation. Elegance in appearance and very comfortable riding qualities.

¶ A demonstration will prove all our claims.

¶ Full descriptive matter on request.

PRICE $3000

Body—King of the Belgians type.
Seating Capacity—Five persons.
Frame—Cold rolled pressed steel.
Brakes—Foot internal expanding and emergency on propeller shaft.
Tires—34 x 4.
Cylinders—4, arranged tandem in pairs.
4 Unit Coil Storage Battery, 6 volts, 60 amp hour.
Transmission—Sliding gear.
Speeds—Three forward and reverse.
Drive—Shaft.
Wheel Base—111 inches.
Wheel Tread—56 inches.
Weight—2,300 pounds.

American Motor Car Co., Indianapolis Ind.

Mayan

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Rambler

The Car of Steady Service



The Model 15 Rambler is a high power touring car of the highest possible grade in design, construction and finish.

It is the logical result of years of experiment and research in the direction of utility, dependability and simplicity, and shows a degree of engineering and mechanical excellence that could be reached only under such conditions.

The power plant comprises two separate units, each with three points support and connected by a universal coupling that relieves each element from strain due to any deflection from relative alignment on the part of the other.

The motor is a four-cylinder vertical type, 35-40 horse power, giving one full horse power to each seventy-five pounds of car fully equipped.

The transmitting mechanism comprises a sliding gear set, countershaft and differential, all in a single housing, with the three points of support at the point of greatest strain. The final drive is by individual chain to each rear wheel.

The lubricating, cooling and ignition systems are all of the most modern types, showing the highest degree of development.

As a whole the car is excelled by none, and at the price, $2500, with full equipment, is without question the greatest value ever offered.

Fully illustrated catalogue describing this and six other models at your service.

MAIN OFFICE AND FACTORY, : : : KENOSHA, WIS., U. S. A.

BRANCHES:

BOSTON, 145 Columbus Ave. CHICAGO, 302-304 Wabash Ave.
PHILADELPHIA, 242 N. Broad St. MILWAUKEE, 457-459 Broadway.
SAN FRANCISCO, 125-131 Golden Gate Avenue NEW YORK AGENCY, 134 W. 38th St.
Representatives in all leading cities

THOMAS B. JEFFERY & CO.

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The

QUEEN



4 Cylinder 26-28 Horse Power, $2,000

Large Roomy Tonneau

FINISH UNSURPASSED

MOTOR—4-Cylinder, 26-28 H. P.
DRIVE—Shaft, Bevel Gear
FRAME—Pressed Steel
WHEELS 32 x 4
WHEEL BASE—101 Inches
TRANSMISSION—Sliding Gear
FRONT AXLE—Solid Forged

GROUND PARTS—All Cylinders, Pistons, Piston Rings, Crank Shaft Valves, Universal Couplings and Transmission Shafts
EQUIPMENT—Five Lamps Horn, Tools, Storage Batteries, and Ironed for Top

Finished in Various Colors—Upholstery to Match

PROMPT DELIVERIES

C. H. Blomstrom Motor Co.

Detroit, Mich.

SEE US AT CHICAGO SHOW

New York Agents:
MAJESTIC AUTO CO.
Cor. 54th St. & Broadway

Chicago Agents:
BRANDSTETTER MOTOR CO.
1337 Michigan Ave.

San Francisco Agents:
BANG AUTO & GARAGE CO.

Los Angeles Agents:
CENTRAL GARAGE

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THE MARMON

"A Mechanical Masterpiece"



Front Wheel Raised Over a Foot, Body Level

A Whole Show In Itself



One Front Wheel and Opposite Rear Wheel Each Raised Over a Foot. Not a Strain Anywhere

THE ONLY CAR WITH FLEXIBLE RUNNING GEAR

No vehicle is really adapted to rough road travel unless its running gear is reasonably flexible. The builders of horse-drawn vehicles have long known that.

So have the more studious builders of automobiles. But not knowing how to mend matters, they have gone on mounting a rigid frame rigidly on the axles, and trying to compensate for the inflexibility of the running gear by using flexible couplings (Cardan joints) and other weakening, troublesome devices in the driving mechanism. Springs are placed at each corner of the car, but these do not permit one axle to be tilted without tending to tilt the others. The result is a constant process of twisting all through the frame and costly mechanism. The rougher the road, the worse the strain. The best of tires do not endure the excessive burden put upon them by this rigid construction.

The Marmon running gear adjusts itself instantly to the roughest road conditions, taking the ruinous shock off the tires, distributing the weight equally at all times to the four tires, and liberating the entire mechanism from binding, twisting strains.

This flexibility (supplemented by full elliptic springs) gives the Marmon over all roads an easy, gentle sway—a very luxury of motion—unknown in any other car.

To accomplish this, two frames are used, operating independently of each other, **each** being suspended on three **pivotal** points. This is not to be confused with the "sub-frame" or rigidly fixed "three point support." It is an exclusive patented Marmon feature

Double Three Point Suspension

The sole duty of the upper frame is to carry the luxurious cast aluminum body.

The lower frame carries the entire power plant. Motor, transmission, driving shaft and live rear axle are a unit in operation—always in perfect alignment, free from binding and twisting strains, no matter how the two frames are raised, lowered or tilted. The Marmon driving shaft is therefore straight and rigid, without flexible couplings or power wasters of any sort. This means power transmission as perfect as can be had in a stationary power plant.

The Marmon motor is unique in its arrangement, efficiency and perfection of air-cooling.

It has the only simple and unfailing oiling system. Main bearings, **crank** and **piston pin** bearings oiled from within the crank shaft, through which oil is forced under uniform pressure. 500 to 1,000 miles on **less** than a gallon of oil in the engine.

The Marmon is unusually stylish in appearance, superb in all its appointments and is mechanically perfect to the last degree.

Write for Booklet No. 4.

Four Cylinders, Air Cooled { **Model C, Four Passengers, $2,500**
Model D, Five Passengers, $3,000

NORDYKE & MARMON CO. (Established 1851) Indianapolis, Ind.

Member American Motor Car Manufacturers' Association



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Berkshire Automobiles

High Class Touring Cars

made and tested in the

Berkshire Hills



A Modern Up-To-Date American Product



16 H. P. $2,000. 25 H. P. $2,500. 40 H. P. $4,300.

Branch Stores:
Chicago, Boston, Brooklyn, Pittsfield, Mass.

Telephone, 2895 Col.

No agents appointed
Entire output will be handled direct by

Douglas Andrews Co.

Selling Agents

1623 Broadway New York

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WALKER



Price $600.

¶ **The 1906 Runabout** is offered to the public as a car capable of carrying two passengers; artistic in appearance and up-to-date in construction and design.
¶ We have not aimed to build a racing car but one for practical use.

¶ While this is our first season with this style of car we have had years of experience in the construction of gasoline motors and can frankly say that no machine of this class has fewer parts.
¶ Among the many strong features of our runabout are the simplicity and accessibility of the engine. We have constructed the crank case and the transmission case in one casting, making the whole engine oil proof, and the fact that the engine is placed under the hood gives free access to the various parts without taking the machine to pieces.
¶ This runabout is just what the public are looking for; easy running, noiseless and one which can get over the ground quickly and with very little cost.

If you are interested in a machine of this kind we shall be pleased to have you investigate the merits of The Walker Runabout.

SPECIFICATIONS

Cylinders—Two, double opposed type 4 x 4, developing 10 H. P. at ordinary speed. Located under the hood, making all parts accessible.

Valves—Intake and exhaust valves are interchangeable and are mechanically operated, the valve openings are 1½ inches in diameter.

Transmission—The planetary type is used, two speeds forward and one reverse. The crank case and transmission case are combined in one casting, the transmission being enclosed. Speed from four miles per hour to twenty-five miles per hour on direct drive.

Drive—Direct shaft drive, bevel gear on rear axle using double universal joints, giving the runabout an easy running motion. The advantage of a shaft drive is that it does away with the filthy and noisy chain.

Oiling—The bearings of the engine and transmission are automatically oiled by four sight feeds which are connected to a compression force feed oiler located on the top of the crank case, giving perfect lubrication at all times.

Chassis—Angle steel frame, 1¼ x 1¾ x $\frac{3}{16}$

Wheels—Artillery pattern 28 x 3 inches. Wheel base 78 inches. Standard tread.

Tires—3 inch clincher or detachable tires.

Tank Capacity—Gasoline 8 gallons. Water 2½ gallons, all contained in the radiator and a continual circulation by means of a gear pump, giving the water a perfect circulation.

Ignition—By jump spark with coil fastened on the dash in front of operator.

WALKER MOTOR CAR CO., 109 Fort St., Detroit, Mich., U.S.A.

For advertisements received too late for classification see the last few advertising pages

LAMBERT

Friction Drive

MODEL 7

PRICE - $2,000

34 H. P. 4-cylinder; tires 32 x 4; 13½ inch road clearance; honeycomb radiator; full equipment of lamps and necessary tools.

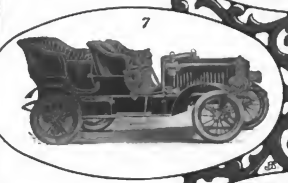


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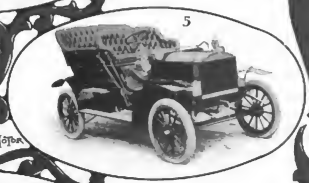
MODEL 8

PRICE - $3,000

4-cylinder, 4¾x5 inch vertical; 34x4½ inch tires. Equipment: Jones Speedometer, two gas lamps with generator, two oil side lamps, tail lamp and necessary tools.



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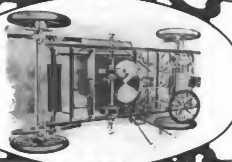


5

MODEL 4

PRICE - $1,050

16 H. P. opposed motor; 30 x 3½ inch tires; high grade touring car at the price of an ordinary vehicle.



MODEL 5

PRICE - $1,200

16 H.P. opposed; 30x3½ inch tires; 94 inch wheel base; 13 inch road clearance; honeycomb radiator.



4



Runabout

MODEL "A" RUNABOUT

PRICE $900. 16 H. P. opposed motor; 30x3½ inch tires; a car for service.

We are in position to make immediate deliveries of all of the above models. Our catalogue, giving detailed descriptions of these cars, is now ready for distribution. Your address, that is all.

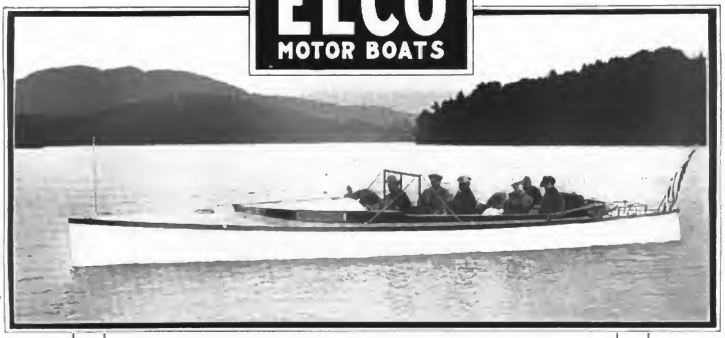
THE BUCKEYE MANUFACTURING COMPANY, Anderson, Indiana

Members of the American Motor Car Manufacturers' Association, Chicago, Ill.

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ELCO
MOTOR BOATS



35-FOOT ELCO HIGH-SPEED MOTOR BOAT

Speed 22 Miles 50-60 H. P. Motor

"It will serve you on water as the Automobile does on land"

The ideal Motor Boat; 22 miles per hour with absolute safety and all comforts of the automobile. The sensation of traveling over the water at this speed is equal to driving a car sixty miles an hour. Water-tight bulkheads. Control of power as an automobile, permitting speed varying from 6 to 22 miles. Four individual bucket seats with aisle between and one wide rear seat. For protection from head winds and flying water, a glass wind-shield is provided. A Cape Cart folding automobile hood covers seating space equipped with side curtains, giving full protection from rain.

ELECTRIC LAUNCHES

ELCO Self-charging Electric Launches can now be supplied. Our new invention, the "charging motor" has made possible the building of electric boats with unlimited mileage. Write for full information.

Our beautifully illustrated catalogue will be sent on receipt of four cents postage.

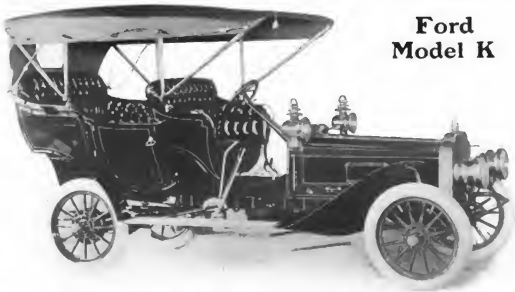
THE ELECTRIC LAUNCH COMPANY

Main Office and Works

AVENUE A, BAYONNE, N. J.

5 Nassau Street, N. Y. 30 min. from Liberty Street N. Y. City, C. R. R. of N. J.

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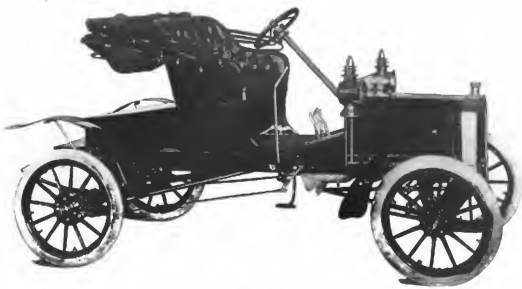
Ford Model K

FORD 6-CYLINDER TOURING CAR

6 cylinders, vertical 4½x4½.
40 H.P.
Speed, 50 miles per hour to 4 miles on a high gear.
Improved planetary transmission.
114-in. wheel base.
Perfected magneto ignition.
Mechanical oiler.
Weight, 2,000 pounds.
Price, $2,500.

The six cylinders of Model "K" giving three impulses to every revolution of the shaft, transmits a more steady flow of power to the wheels than any Touring Car ever built. The great surplus of energy makes possible the operation of the car without transmitting power through several changes of gear.

Ford Model N



Motor, 4-cylinder, vertical; cylinders 3¾-in. bore x 3¼-in. stroke, 15 H.P.
Speed, 40 miles an hour down to 3 miles on high gear.
Improved planetary transmission, with improved clutch.
84-inch wheel base.
Pressed steel frame.
Roller bearings on rear axle, with ball-bearing thrust—special design.
Ball Bearings on Front Wheels.
Wheel Steering (Fitted with Ford reduction gears) takes all the Strain from steering over the roughest road, an exclusive Ford feature.
Weight, 700 pounds.
Price, $500.

TEN THOUSAND OF THESE CARS IN COURSE OF CONSTRUCTION—MORE THAN THE COMBINED RUNABOUT OUTPUT OF ALL OTHER AMERICAN FACTORIES.

FORD MOTOR COMPANY. - DETROIT, MICH.

Member American Motor Car Manufacturers' Association, Chicago.

Branches: 147-149-151-165 Columbus Ave., Boston. 1721-1723 Broadway, New York; 727 Main St., Buffalo; Broad and Button-wood Sts., Philadelphia; 1413 Michigan Ave., Chicago; 1916 S. E. Euclid St., Cleveland; 308-310 E. 11th St., Kansas City. Canadian Trade supplied by the Ford Motor Company of Canada, Ltd., Walkerville, Ont.

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The Evolution of the Maxwell Doctrine—Maxwell Cars

The Doctrine

1st. A cylinder of 5 inch bore with 5 inch stroke is ideal for a double opposed gasoline motor.
2nd. A double opposed motor, 5x5 inches, when properly made, develops about 20 **actual** horse power.
3rd. To use four cylinders for motors of 20 or less horse power is unnecessary, because thereby the number of wearing parts is unnecessarily increased.
4th. 20 **actual** horse power, not momentum or fly-wheel horse power, is enough for every requirement except excessive speed or extreme fashion. Therefore a two cylinder, 5x5 inch, double opposed motor is the best, and **it is as evenly balanced as four cylinder construction,** is very much less complicated, and much more reliable. It would take four 4x4 inch cylinders to develop the same power as two 5x5 inch cylinders properly made.
5th. Four cylinder cars appeal largely to "Fad and Fancy" only; **two cylinder cars produce reliable service.**

The unprecedented successful record of the Maxwell Cars during the season of 1905 prove the **wisdom** of the above **doctrine.**

Reasons for the Success of the Maxwell

Common Sense was the motive of its construction, not the impulse of "Fad and Fancy."
A 5x5 inch horizontal double opposed motor for a touring car, and a 4x4 inch for a lourabout, have been proved the ideal types for service and reliability.
Maxwell horse power is demonstrated by the **actual continual test,** not by the flash system of testing which includes that resulting from the inertia of the flywheel. Therefore **Maxwell horse power** is **actual horse power.**
Maxwell Cars are splendidly made as well as perfectly designed.

MAXWELL FEATURES

Multiple Disc Clutch Bevel Gear Drive Three Point Suspension No Pump Great Reliability and Economy Metal Bodies
Maxwell Cars are sold under the positive guarantee that **as good a car** cannot be sold at a lower price.

Notice to Automobile Buyers

Perhaps you are not up in the manner of measuring the horse power of a gasoline motor. There is **no greater fake** in any industry than the horse power fake in automobile advertising.

The manner actually used for ascertaining horse power it may be well to explain. A brake is constructed of a band with a fibre or wood lining. This band partially surrounds the periphery of the flywheel. To one end of this band is attached a lever. The other end is held to the floor or frame of the testing stand. A spring balance of the same form as is ordinarily used by butchers and grocers is fastened to a hook in the floor or frame out towards the end of the lever. The revolutions of the flywheel exert a pulling pressure through the band and the lever on the spring balance. The number of pounds pulled on the spring is then computed according to an accepted formula into horse power. The principle of the formula is so many feet of travel of the rim of the flywheel to so many pounds pull on the spring, figuring the length of the lever, and the result is foot pounds, there being 33,000 foot pounds to 1 horse power.

Where the Fake Comes in

Some manufacturers speed their motors up at a terrific rate, and then for **a second** or a fraction of a second apply pressure on the brake band, thus throwing the inertia of the flywheel, **in addition** to the power of the motor, against the spring. This method, therefore, represents not only the pulling power of the flywheel, **But, also,** the additional force necessary to reduce the momentum. You have often watched a butcher weigh meat. He will throw a pound on his spring balance, and before the hand has a chance to settle back into its true place he will collect pay for two pounds from his customer. *This illustrates the wrong way.*

The only true and proper way is that which is **used by this company,** which is to apply the test **for hours** at a time, providing means for keeping the brake band cool.

That is why the **Maxwell** Tourabout and the "Gentleman's Speedster," though rated by us **at only 10 Horse Power actual,** is the **equal** in results, hill-climbing and general road performance to many cars of several times its rated horse power.



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The Maxwell Line for 1906.



No. 1—16-20 H. P. Touring Car. Price, $1450 f. o. b. factories



No. 2—10 H. P. Tourabout. Price, $780, f. o. b. factories.



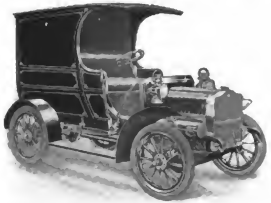
No. 3—10 H. P. Gentlemen's Speedster. "The 50-an-hour car." Price, $800, f. o. b. factories.



No. 4 16-20 H. P. "Doctor" Maxwell. Price with top, $1,375. Without Top, $1300 f. o. b. factories.



No. 5—16-20 H. P. Limousine Price, $2000, f. o. b. factories



No. 6—16-20 H. P. Delivery Wagon. Price $1400, f. o. b. factories.

Maxwell-Briscoe Motor Co.,

Factories:

Chicago, Ill. MAIN OFFICE, TARRYTOWN, N. Y. Pawtucket, R. I.

Branches: { Maxwell-Briscoe, Inc., New York, N. Y. / Maxwell-Briscoe McLeod Co., Detroit, Mich. / Morrison Tyler Motor Co., Boston, Mass. / Fisher Automobile Co., Indianapolis, Ind. / Maxwell-Briscoe Chase Co., Chicago, Ill. / Richard Irwin & Co., Foreign Representative.

Agents desiring territory should apply at once.

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The car for today, tomorrow and years to come.
Built by practical men.

Aerocar

The Aerocar is a magnificent, handsome automobile in every detail of design, workmanship, equipment and finish. It is so thoroughly high-grade that it compares most favorably with the highest-priced cars of foreign as well as American make. It is built by practical men who know from intimate connection with the automobile trade just what the motorist most desires. The Aerocar embodies to the fullest extent every essential requirement and the more minutely its mechanical construction is investigated the more conclusively will this fact be demonstrated. Hence, the severest investigation and the sharpest comparison are courteously requested.

We again direct attention to the following:

SPECIFICATIONS.

Model: A.
Price: $2,800 f. o. b. Detroit.
Body: "Side Entrance" Tonneau. Front doors (easily detached and complete without them.)
Color: Royal Blue.
Seating Capacity: Five persons.
Total weight: 2,000 pounds.
Wheel base: 104 inches.
Wheel tread: 56 inches.
Tire dimensions, front: 4x34.
Tire dimensions, rear: 4x34.
Steering: Worm and nut.
Brakes: Two (rear hub) and transmission.
Gasoline capacity: 20 gallons.
Frame: Pressed steel.
Motor power: 24 h.p.
Number of cylinders: Four.
Cylinders arranged: Vertical in line.
Cooling: Air.
Ignition: Jump spark with storage battery.
Drive: Shaft, bevel gear.
Transmission: Sliding gear.
Speeds: Three speeds forward and reverse.
Clutch: Leather-faced cone clutch.
Road clearance: 9 inches.
Style of top: Extension.

DETAIL INFORMATION.

The frame is of pressed steel and sufficiently strong so that there is no possibility of its sagging or becoming distorted from the hardest possible use to which the car may be put.

The four cylinders of the motor are cast separately, and are of a peculiar, symmetrical, flanged construction. The bore is 4 inch by 4 inch stroke. Both cylinders and pistons are made of a special gray iron mixture, very hard, fine-grained, and close, and without speck or blow hole. The construction of piston and rings is such that it prevents an excess of lubricant accumulating on top of piston, obviating the usual deposit of carbon, generally found on either air or water-cooled motors.

The crank case is in two pieces, and are fine specimens of aluminum castings, with hand-hole plates, making bearings and connecting rods easily accessible to inspection.

The mechanically operated valves, located in the cylinder head, are interchangeable and made of nickel alloy.

The crank shaft is of generous proportions, made from high carbon steel, hammered, forged, rough-turned and ground to size. Phosphor bronze and nickel Babbitt bearings, of ample wearing surface, are found throughout the motor.

The commutator is placed in a vertical position, which is very accessible. Both primary and secondary wiring are incased in fibre tube.

Carburetor is thoroughly automatic, making starting almost instantaneous and fuel consumption very economical.

Lubrication is of the splash system, through the agency of a Hill Precision Oiler.

In addition to the peculiar construction of the cylinders to facilitate air cooling, a 15-inch fan is used, the six blades of which are made of sheet brass. It is carried on Hess-Bright ball bearings. The construction of this fan is theoretically and practically correct, the blast being concentrated directly on the cylinders. Running on a still day the fan is unnecessary, the motor cooling entirely by the movement of the car. Some of these motors have been run 3,500 miles, without an adjustment to the connecting rod or bearings being necessary.

See the Aerocar at the Automobile Shows if possible, and let us give you a practical demonstration of its running merit.

Illustrated literature promptly supplied on request.

For 10 cents in stamps we will mail a beautiful gold-plated scarf pin.

The agent who will have the selling agency for the Aerocar will have a profitable business. If interested write us promptly.

THE AEROCAR COMPANY, - Detroit, Michigan

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THE CAR THAT ACHIEVES

The Cadillac has always been the car that *does* things. Whether the test be that of endurance or power, or one of severity of road service, this wonderful machine has never been found wanting. It knows no balk, no hesitancy, no delay—always ready, with energy to spare.

By this dependability of service, coupled with unusual economy of maintenance, the Cadillac has made such phenomenal advancement that its factory is now the largest of its kind in the world.

The qualities upon which this unparalleled growth is based are more pronounced than ever in the magnificent new cars for 1906. Embodied in these are many unique and important improvements—improvements which make the



Model K, 10 h. p. Runabout
$750. f. o. b. Detroit

CADILLAC

conspicuous for its **individual** merit.

Among them is a wonderful mechanical feed lubricator which supplies oil to the motor in quantities which vary according to the speed of the engine, when properly adjusted, always feeding enough, never too much or too little. The new rocker joint on the front spring allows the car to pass over obstacles several inches in height without transmitting any material jar to the car, insuring a maximum of riding comfort and a minimum liability to breakage. In outline and finish these new Cadillacs are truly art creations. Of the Victoria type, their grace and exquisite beauty, their tone of quiet richness, appeal at once to fastidious motorists. We want to tell you more about the Cadillac by sending you a free copy of our interesting Booklet S. A postal request brings it, together with address of nearest dealer. The 1906 models include:



Model M, Light Touring Car
$950, f. o. b. Detroit

Model K, 10 h. p. Runabout, $750.
Model M, Light Touring Car, $950.
All prices f. o. b. Detroit
Model H, 30 h. p. Touring Car, $2,500
Model L, 40 h. p. Touring Car, $3,750

CADILLAC MOTOR CAR CO., DETROIT, MICH.

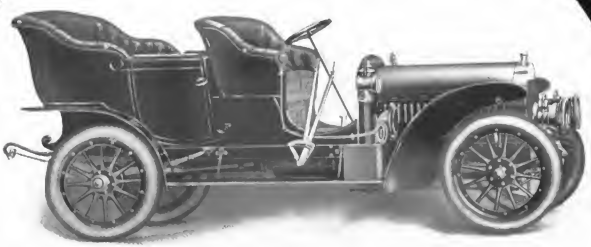
Member Asso. Licensed Auto. Mfrs.

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Wayne

One of Our 1906 Models



Model F—$3,500.00

MOTOR, 4-cylinder, vertical cylinders, 5½x5 cast in pairs. Cylinders and pistons ground. Engine develops by brake test 50 H.P. Water Cooled. **Ignition:** jump spark with quad coil and storage battery. **Transmission:** sliding gear with three speeds forward and reverse. Hess-Bright ball bearings throughout. **Rear Axle:** shaft drive, floating type. **Front Axle:** one beam drop forged, one piece, nickel steel. **Wheel Base:** 114 inches. **Tires:** 34x4½ inches. **Equipment:** includes all necessary tools of the best quality, two side lamps, two acetylene head lights, with generator, tail lamp and tube horn.

MODEL K.	Four-cylinder, five-passenger touring car; 35 H.P., sliding gear transmission.	PRICE, $2,500
MODEL B.	Four-cylinder five-passenger car, 24-28 H.P.; sliding gear transmission	PRICE, $2,000
MODEL C.	Five-passenger car, double opposed motor, 20 H. P., planetary transmission	PRICE, $1,250
MODEL H.	Two-passenger runabout, double opposed motor under hood, direct drive, 24 H. P.	PRICE, $800

The Wayne Agent can supply a high grade car at any price his customer may demand. **We have the Best** car for the customer, proposition for the agent. Write for Agency arrangements and descriptive matter. Chicago Show, of course.

WAYNE AUTO. CO., DETROIT, MICH.

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MOTOR

The National Monthly Magazine of Motoring

Entered as second-class matter at the New York, N. Y., Post Office, March, 1904

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Telephone 3010 Columbus Cable Address: Moforia 1780 Broadway, New York City

25 Cents a copy *Subscription, $3 a year* *Foreign, $4 a year*



















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A PANORAMA OF THE

The New

THE future historian of motoring will clearly note the success of the opening of the show season in New York and recognize the fact that the twin shows, although held in separate buildings and under separate and distinct auspices, were really Siamesed by the ebb and flow of the motoring public from one function to the other, and that the question of a closed or open show, licensed or unlicensed, did not enter into the matter at all, excepting in the prolific press notices and prodigious advertising of the managers of the two shows at the Garden and the Armory

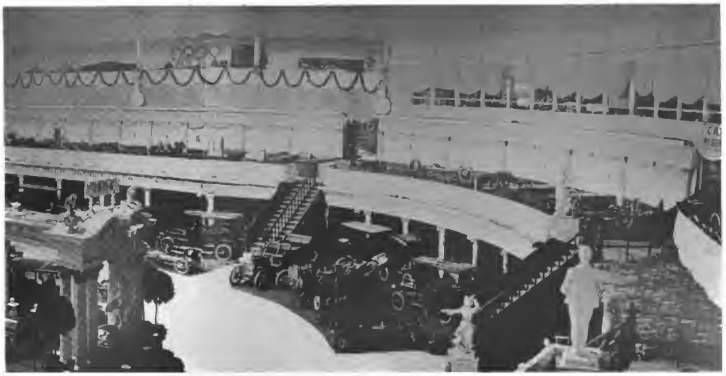
The show season will now go on with undiminished vigor after the national shows by way of what are called local shows until the very opening of the outdoor season. The oracle of the opening shows of 1906 has spoken in no uncertain voice, and the verdict of the metropolis will have no uncertain influence, because in show parlance the prestige of a metropolitan debut is recognized everywhere, where motor-cars are welcome.

Some of the faint hearted who thought last year

A PANORAMA OF THE AUTOMOBILE



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AUTOMOBILE SHOW, MADISON SQUARE GARDEN

York Shows

that they had detected the little rift in the lute which would spoil the harmony of the coming year, when the Asssociation of Licensed Automobile Manufacturers determined to have a show wholly independent from that which had hitherto for so many years been so successfully, jointly operated by the Automobile Club of America and the National Association of Automobile Manufacturers, were most agreeably surprised to find even two metropolitan shows, packed as they were with exhibits from ceiling to cellar, were all insufficient to meet the demands of the makers for the tremendous influx of the motoring public, and this, notwithstanding the fact that ere the doors were opened many prominent makers had disposed of their entire output for the whole season and were looking forward to booking deliveries for 1907.

Procrastination has always been the bane of our makers, and hence an early show would mean early deliveries, with *toujours pret* as a motto, and there are rumors that the Automobile Club of America show will be held during the coming year in

SHOW, SIXTY-NINTH REGIMENT ARMORY



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THE ARMORY SHOW, FROM THE NORTHWEST CORNER.

November. Something must also be done to cut down the attendance, for certainly there has been a wide divergence from the original idea of the show. The automobile show was at first the happy thought of some members of the Automobile Club of America in a time of motor feebleness when the young sport and industry needed all the aid it could summon and command. To help things along through the winter, and doubtless on the strictly social side, it was proposed to get together in one place as many different patterns of American motor-cars as were produced at that time, together with a loan-exhibit of foreign cars owned by the members of the club, the idea being to bring together the pioneers of the new sport and industry and the general public, and removing by personal contact that involuntary antipathy to every new form of transportation. From that feeble start the shows have grown as motoring has grown.

During the years that have followed it has brought the public into line until in New York not only two, but three, or even four buildings are not large enough to hold the shows. Even in spacious Chicago there is not one building large enough, the Coliseum there requiring the annexation of an adjoining armory also.

It is perfectly plain and obvious to intelligent and impartial observers who ever studied the show question from every point of view that something must be done, even to doubling the price of admission, to keep the mere amusement seeker and sightseer away from the shows, although it must be conceded that even these might in the future become interested in the motor, or might be interested in influencing legislation. The main trouble has come from the American habit of overdoing things and the makers themselves are to blame for deviation from the original idea and for going into gorgeous decorations, electric lighting, and costly furnishings and a prodigal waste of printed matter. When the aisles are packed and the affair is a society event the greatest thing in a show, the one chiefly cared for, and really about the only one that can be seen, is the show itself, the crowd itself being what the crowd attends, and so the show really becomes a spectacular waste instead of an exhibit of motor-cars and accessories for those who really want to see them.

From the point of view of the motoring public much can be well said on the favorable side of the show question. The show brings under one roof all the new models and accessories for the coming year, affording ready means of comparison, instructive, even if sometimes odious. The maker and the dealer and the owner come together, and all hands have an opportunity to renew old friendships. The copious reports and illustrations in the daily press and periodicals, not to say anything of the trade press, arouse expectation in the motoring public, and undoubtedly make many new converts; besides the gap between the outdoor seasons is thus bridged across "the winter of our discontent."

The annexation of one great armory will, unless the city does its manifest duty in providing a central municipal show place, have to be supplemented ere another year comes round by the procurement of yet another such a privilege, and fortunately the splendid new home of the Seventy-first Regiment at Thirty-third Street and Fourth Avenue stands temptingly near both the good old garden and the new armory.

Both shows have now become memories, and their glories and triumphs are traditions in motor-car history; but it is not too late to note the boldness of conception and keen business acumen which actuated the promotion of both. Indeed it is singular evidence of the existence of progressive conditions and the faith in them that the two managements acting entirely independent of each other should, as it were, by telepathic prescience, have formulated an entirely new basis of show management.

In the preparation of the two buildings and of the spaces arranged for exhibits the individual was eliminated and subordinated absolutely to the will of the managers. Neither the Paris nor the London show even began to consider the dethronement of the exhibitor's decorative artist, much less to set up in its place the Draconian rule of a simple democratic treatment which gave to no exhibit the extraneous advantage of gorgeous surroundings and permitted none to suffer in the shade of his neighbor's pomp. "Equal right for all and privileges to none" was the underlying principle of both shows. The result of this departure, from an artistic view, must be declared to be beyond all praise.

Both shows, from a decorative point of view, were gems. The Garden show, in its virgin whiteness, with its sky of turquoise blue, might well be compared to an opal or a pearl, and when one looked at the Greek pergolas and Corinthian columns with their gilded capitals, it only needed the final touch of the aria from "The Bohemian Girl," which the orchestra played, to dream that one "dwelt in marble halls." Plaster evidently is the staff of life of the modern decorator's art for temporary use, at least. The Automobile Club was certainly modest in its preliminary announcements regarding the decorative scheme of the armory; and, in the same line of thought as the preceding one, the armory might well be called an emerald, a tribute indeed in its green and gold decorations to the nationality of the gallant Sixty-ninth, who are shortly to occupy it. If the sundries and accessories men in the Garden could be called cliff dwellers, why, then, the car exhibitors in the basement of the Armory might well be called cave dwellers, so hidden were they.



THE ARMORY SHOW, FROM THE NORTHEAST CORNER.



THE ARMORY SHOW, FROM THE SOUTHEAST CORNER.

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Diana, indoors and out, was the emblematic goddess of the Garden show; while Mercury, with his winged heels, represented the Armory show, a singular feature of the whole week being that Diana's hand pointed persistently towards the southeast and east, in the direction of the Armory, and which probably accounts for the nasty weather that the demonstrators had to contend with, show time in New York evidently being snow and mud time.

A singular feature among the demonstrators was the great number of public cabs that assembled around both buildings, puncturing the atmosphere with their cries of "Cab! Cab! Cab!" whereas at the horse show the motor-car takes the place of the cab. It is understood that a quiet movement is under way by both associations to do away with the demonstrating idea at the shows on account of the limited time, and because, after all, such brief demonstrations are not really practical, many of them being mere ride grafters.

A slow six-day stroll around the main floor of Madison Square Garden revealed there, as it did at the Armory show, that two of the leading features and tendencies of this year's product are the use of larger tires, both in diameter and cross-section, and which has brought with it necessarily the use of larger wheels, the extreme limit being the use of 36 inch wheels with 5-inch tires. Necessarily, of course, this brings with it an increased first cost, but naturally enough it also lowers the final cost, to say nothing of the cost of maintenance and repairs. Abroad, big tires and big wheels have always been in vogue, but American makers have always heretofore considered that a 30-inch wheel and 3-inch tire was big enough for a car of any size, while a 34-inch tire was considered colossal, the 32-inch tire being bigger than the average in use a year ago, but we may expect to see during the current year 34 and 36-inch tires used everywhere on big cars.

It must also be borne in mind that a large wheel and tire rolls over an obstacle easier than a small wheel and tire does. The old bugaboo of a low center of gravity so that a motor-car would not readily upset is no longer to be feared because the makers have learned to use not only big wheels, but also to carry the power plant low on the chassis without elevating the body unduly high in the air.

Another great and predominant feature is the use of ball bearings and which use is so pronounced that it may be said to be a leading feature and tendency of present-day construction. Ball bearings practically came in with the bicycle, and on that vehicle became used to the exclusion of all other types of bearings. But bicycle use and motor-car use are two different things. Low grade material merely case hardened would not stand the shock of motor-car use. In motor-car use it has been conclusively demonstrated that a two-point annular non-adjustable ball bearing is one of the best to use. There are, however, some two-point ball bearings used that are adjustable.

Experience has demonstrated that it is best to concentrate the entire load on the one ball bearing in the journal because it is then known just where the load is carried, while the bearing length is very materially less. The use of a number of ball bearings to build up a journal produces results similar to those in ordinary plain journals where it is not known where the load is concentrated. It may be at either end or



THE GARDEN SHOW, LOOKING OVER THE EXHIBITS FROM THE PRESS ROOM.

the middle, because it is not evenly distributed, and even if this is attempted it must be assumed when providing bearing surface to bring the unit area intensity of pressure down or multiply the number of ball bearings with a view to each carrying an equal share of the total load.

Two-point bearings are now made in sizes of balls running from ¼ to 1⅝ inches in diameter and containing from 6 to 21 balls in each case. These modern ball bearings are remarkable for the very small space they take up endwise including the oil retaining and dust-excluding arrangments, this varying between ¾ and 1½ times the shaft diameter. The larger the shaft, of course, the less is the relative bearing space. The bearings are made in different types, the radial bearings, so-called, being those that carry the load at right angles to the axis of the shaft, a good example of this bearing being the one that is used in the wheels.

The thrust bearing is made similar to the radial type, but mounted to take the load parallel to the axis of the shaft, thrust collars also being used to take the loads parallel to the axis of the shaft. The radial bearing consists of an inner race and outer race, and a series of ball separators. The balls roll in grooved tracks of circular cross-section, having slightly larger curvature than the balls, so that these contact with the races only at the bottom of the grooves. The contact, therefore, is of the two-point order as the ball races are each a single complete ring without joint or opening of any kind. The balls serve to lock the whole together as a complete unit. Elastic separators between the balls contain also felt plugs, but incidentally store up lubricants to guard the bearings at any time against neglect.

Of the novelties noticed, but which will simply be briefly mentioned here because they have been taken care of and described under their proper heads elsewhere in this issue, are the Haynes master clutch, which is really one of the master clutches taken out of his individual clutch gear and applied separately instead of a cone clutch, so that while it is used in a new place, experience has proved its value elsewhere. The



THE GARDEN SHOW, LOOKING ALONG THE LEFT AISLE FROM THE ENTRANCE.



THE GARDEN SHOW, LOOKING ALONG THE RIGHT AISLE FROM THE ENTRANCE.

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waterless Knox has a new double bevel drive transmission of the ball bearing Mercedes type, and on the Darracq was noticed a new side lever speed controller arrangement.

Clement-Bayard showed a collapsible and invisible extra seat on the touring car, it being fast appearing body with all the characteristics of the racing body and very low center of gravity. The Buick four-cylinder car had a five-point suspension with two flexible points and the new Renault had all four cylinders of its 10 m. p. car in one casting, control being by means of the accelerator only.

The Decauville showed a novel doctor's cab operated from the inside, and in the new Franklins the side door opens towards the back, permitting of easy entrance. The Locomobile booth was dignified by showing the only racer in the show, Tracy's famous Vanderbilt racer. The Cadillac still retains its planetary transmission, which differs, however, from all others because it has three speeds forward instead of two, as usual, and on the big cars is fitted a separate clutch disconnecting it from the motor.

An odd thing was the ambulance on the Studebaker stand. On the Matheson all the valve operating parts were on the top of the motor. The De Dietrich had its throttle operating on the clutch, the valves and igniters all working on one cam shaft. A novel feature providing for the centering of the clutch without any twisting consisting of two parallel studs, on which the clutch slides into the flywheel, making it impossible for it to squirm or twist out of place.

An electric Columbia was a royal victoria body hung entirely clear of the chassis, swinging from both ends on the old fashioned C shape leather straps such as were used years ago on the old Concord coaches. The upholstery in this car was simply gorgeous, being royal purple and black with the finest imported coach lace trimming, a hansom cab on the same stand being done up in heliotrope coach cloth and lace to match.

One of the new Hewitt cars was peculiar because it had an open crank case motor such as is used in marine practice. One of the neatest exhibits of Hess-Bright ball bearings was that on the Stearns in its transmission case, the Walter car also using a double sliding gear of the selective type closely patterned on the Mercedes practice.

On the Stevens-Duryea stand was shown the crank shaft of their new six-cylinder 50 m. p. seven-seated car, the car itself being used outside early in the week for demonstration purposes. A similar shaft to this, but for four-cylinder use, was shown on the American Mercedes in the Armory, the Stevens-Duryea shaft having the advantage of a fly-wheel attached which carried the crank shaft in its revolutions over the dead center, a slight touch sending it revolving for an indefinite period.

On the big Apperson car was an ingenious system of electric signals for chauffeur, besides a positive lock on the change speed gears. The Orient buckboard had a new friction drive, and the Northern made a hit at the show with its air clutch, its air brake, its air pump, and its four cylinders all cast in one piece, and a safety spark retarding device.

The Pope-Hartford had its mechanically operated valves on top of the cylinder, making it one of the quietest motors in the show. Besides that its spark and throttle on top of the spring post does not revolve with the wheel. The Pope-Hartford runabout was the highest powered runabout shown.

The Elmore two-cycle was not only shown in two, but in three and four cylinders, a feature of their construction being their new cut-out. The new Oldsmobile four-cylinder runabout was equipped with a magneto, quite a change from their previous specifications. The new Columbias had an automatic carbureter weighted with an auxiliary air belt, the new crank shaft being built of nickel steel, the front axle being a single drop forging. The 24-28 m. p. car now uses a low tension make-and-break magneto.



THERE WERE TWO KINDS OF MOTOR CAR SHOWS IN NEW YORK DURING SHOW WEEK —THE "AUTOMOBILE" SHOWS AND "THE VANDERBILT CUP." A "STAGE SHOW" AT THE BROADWAY THEATRE, IN WHICH MISS ELSIE JANIS APPEARS IN A PEERLESS ON THE STAGE.

The two big Pierce Great Arrows have all the control on the steering wheel pillar, the only side lever used being the emergency brake. This steering control is a very clever conception of designer Ferguson's very powerfully worked out for easy control of a big car, taken from the old De Dion pillar control.

The Packard still retains its famous rear axle transmission with the differential all in one housing, although it has rejected its three-point transverse suspension and now uses the accepted form; an ingenious thing is a switch on the spark plugs for testing the valves on opposite sides of the motor. A lever for the emergency brake also throws out the clutch. An oil tank is now fitted between the cylinders.

On the Autocar the control for both spark and gas was in the rim of the steering wheel instead of being by means of small levers. The Peerless chassis was enameled black, which, being baked on, produced a hard and lasting finish, a novelty on the inside of the car being an electric annunciator.

On the Pope-Toledo all the valves were found in the head of the motor, an auxiliary gasoline tank being provided. The Studebaker had in its make-and-break low tension magneto system used exactly the same method of breaking the circuit as Otto did in his original device, a good instance of reversion. The Royal Tourist showed one of the finest chasses in either show, an extra attraction being a Quinby body, many of our buyers of high priced cars now preferring to buy the chassis only, in accordance with European practice, and order the body

(*Continued on page* 150.)

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THE CHICAGO SHOW.



THE COLISEUM.

THE decorations in the Chicago Coliseum and the First Regiment Armory, in which the Chicago Automobile Show will open on February 3d, to run until the 10th, are made according to the uniform plan adopted by the management. The roof and walls of the Coliseum and the roof of the Armory are decorated in white and gold, the Flemish oak paneling on the walls extends to a height of ten feet, and the background is of gold and green. Above, there is a cornice of staff work in various motor-car designs, bearing opalescent electric lights, and the decoration covering the roof meets the top of the wall decorations.

The pillars of the Coliseum are included in the paneling and lighting scheme, so that exhibitors under the gallery will be practically enclosed in private rooms, the front only being open. The Chicago Edison Company has provided a set of fixtures of unusual brilliancy, which will render extraordinary lighting effect in the spaces.

Outside the building the management has provided a most powerful searchlight to enable visitors to witness the demonstrations on Wabash and Michigan Avenues to full advantage.

With all the advantages of greatly increased floor space, the addition of the Armory to the Coliseum, there is not room enough for all the applicants for space. In the two buildings there is a total of 112,762 square feet, but this has not proven nearly large enough to accommodate all the manufacturers of machines and accessories. In 1905 there were seventy-six companies exhibiting complete cars, while in the approaching show there will be ninety-five, and the total number of exhibitors at the last show was 170, while at the 1906 exhibition 210 concerns have been given space.

The list of exhibitors of finished cars shows that the importer is now seeking the western market in earnest, for several well-known foreign cars—Smith & Mabley's importations, and the Panhard, the Delaunay Belleville, English Daimler, etc.—will be shown, a significant departure from what one would expect, taking previous western shows into consideration.



THE ARMORY.

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SOCIETY FOLK WHO MOTOR

By Priscilla Speedwell

THE first Saint after Santy is he who brings us valentines. Santy hangs up the mistletoe; Cupid gets busy, and St. Valentine's Day brings in the returns. Cupid, during January, and February's first days, has been on the alert, jumping from one motor-car to another. At Palm Beach and in Cuba, he found "Easy Marks." Motor-cars, by the way, are to be the favorite wedding gift, and already the motoring honeymooners are about to start out. Like Major and Mrs. Harrison K. Bird, who were among last year's honeymooners, many of the bridal-cars were bought at the annual show in Madison Square Garden.

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MR. WILLIAM B. OLIVER, often referred to as the handsomest man in the New York Stock Exchange, will go abroad again this year for a long tour in his Mercedes.

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MR. AND MRS. HARRY HAMLIN will soon join the motorists of Washington. Mr. Hamlin has a new 70 motor-power Mercedes, exhibited first in Paris, and then sent to him in New York. He traveled from Buffalo to the Waldorf-Astoria in his car, accompanied by his chauffeur, mechanic, and valet, making the journey in nineteen hours. Both Mr. and Mrs. Hamlin are as enthusiastic about motoring as when they purchased their first car. They traveled 30,000 miles in their Panhard during the first year and 25,000 miles in their Mercedes this fall, making a tour of the Berkshires.

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MR. J. HENRY SMITH, the bachelor-sphinx of the Four Hundred, bought during the last week of 1905 a Ramier Landaulet of 22-28 motor power. Mr. Smith has never been known to commit himself on any subject whatever. His cheeks are perpetually rosy. His complexion never is affected by cardiac fluctuations, but rumors of matrimony are rife. Who will be the lady to take her seat in the new Ramier car?

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MINING invariably means motoring. One can hardly name a man, with wealth dug from the earth, who does not glide over the surface of it in a speedy car. Mr. John Markle, a coal baron, of Wilkesbarre, Pa., whose wife is a daughter of Mrs. J. Hood Wright, has a fine Leon Bollée that he brought over last year after a long continental trip, unmarred by a single accident.

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MR. JEFFERSON M. LEVY'S new motor-car, a fine Mercedes, just delivered from abroad, must have been built with a view to hill-climbing. Mr. Levy, formerly a Congressman, owns Monticello, the one-time residence of Thomas Jefferson. Monticello is an Italian word meaning "little mountain" and descriptive of the hill on which the house stands. When President Roosevelt visited Monticello, however, he refused to ascend the mountain in anything even as modern as a four-wheeled carriage. He insisted upon riding upon a long-tailed nag as Jefferson did. Mr. Levy, however, will go up this spring in his motor-car.

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OPPOSITE Mr. Levy's city house on East Thirty-fourth Street is the residence of E. N. Dickerson, the lawyer. Mr. Dickerson's motor-car is seen daily in front of his door. Both he and Mrs. Dickerson, who is especially an adept with rod and line, are keen for all sorts of sport.



MISS MERRIAM, DAUGHTER OF THE U. S. DIRECTOR OF THE CENSUS, IN HER ELECTRIC.

DURING the winter time, the motor-girl is prim and pretty. She is the daintiest, sweetest girl in town. In summer, she may have sped over the country roads with flying hair and veil and sunburned nose. But in town, the girl who rides in the motor-car manages in a miraculous way to look more securely put together than the maids and matrons in the open victorias. One of the daintiest of the winter motor-girls is Miss Cornelia Bryce, General Lloyd Bryce's daughter. Seated in her father's Rochet-Schneider the other day, with blue plumes in her picture hat, and fair hair unruffled, she made a picture indeed. Mrs. Robert Goelet, whose hats have ostrich plumes in thick clusters, and decorations that wave like a birdgeon, always looks better in her motor-car—that is, she "streams" less—than when seated, in great state, beside her attractive, golden-haired husband, in their elegant eabriolet.

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GEORGE AUSTIN MORRISON, JR., one of the motorists of "millionaire's row," living but a block or two below the home of the late James F. Martin, has, by his recent purchase, declared for continuation of faith in motorine, in general, and in the Ramier in particular. He bought a 30 motor-power car of that make, having, previous to that, owned a car bearing the same name of smaller motor-power. The Morrison family is identified with country life at Ardsley, and the new Ramier is one of the cars that stir up the phlegmatic atmosphere of the Sleepy Hollow *locale*.

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SOCIETY men seem prone to take up the manufacture of motor-cars as a business. Of course, even a man known as a society man may have ambitions above cotillions and posing in the back of an opera box; but every now and then one reads of some man in the *Society Register*, who has allied himself with the motor-car industry. Mr. Clarence F. Wyckoff, the president of the Decauville Company, is the son of the founder of the firm of Wyckoff, Seamans & Benedict, of typewriter fame and fortune, who were a trio well known in Brooklyn. They all built three brownstone houses side by side, intending to live in a loving row. Mr. Clarence W. Seamans was one of the first of Brooklyn motorists. He now resides in a magnificent palace on St. Mark's Avenue.

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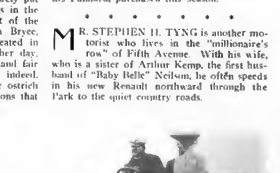
MRS. LESLIE CARTER takes great delight in her Decauville car. During the spring, summer, and fall, she makes use of it over the roads of Shelter Island, where Paul Rainey was one of the first dust-raisers with his motor-car.

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MORRIS LOEB, Ph.D., is one of the fortunate few men of science and great mental achievement whom society stands for, for he is a member of many societies, such as the A. A. A. S. (which, very strangely, in spite of its three large "A's" does not elevate itself to motor-cars), and the Scientific Alliance. So perhaps he would come better under the head of "Scientific Folk Who Motor," but motor he does, and with great enthusiasm in his Panhard, purchased this season.

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MR. STEPHEN H. TYNG is another motorist who lives in the "millionaire's row" of Fifth Avenue. With his wife, who is a sister of Arthur Kemp, the first husband of "Baby Belle" Neilson, he often speeds in his new Renault northward through the Park to the quiet country roads.



MR. CHARLES G. GATES AND MRS. GATES IN HIS MERCEDES.

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Through the War Country



By C. H. Claudy

MANY men of many minds. Doubtless every one who motors, whose motoring deserves the name and is not confined to trips of a few hours, has a different idea of what constitutes the most enjoyable tour. Some want scenery, some speed, some a record from point to point, some historical interest. But if all these factors which are compatible can be combined, have we not a trip which should satisfy the most exacting? All these things,— beautiful scenery, stunning roads, historical interest, and the opportunity for speed, can be had in a tour open to any one in the East, and a tour, moreover, little known and as yet almost virgin to motor mania. This tour is by way of Baltimore or Washington to Frederick, Md., Hagerstown, Sharpsburg, Antietam, Harper's Ferry, and back through Jefferson to Frederick, and so home.

Now, this is not an ordinary tour. It takes you over country, every part of which is fraught with interest from battles of the Civil War, and through scenery which cannot be surpassed anywhere in the East, and shows the observer more of the beauties of one of the most beautiful States in the Union than he could learn in any other way. To cap the climax of good things, it is a short tour, and an inexpensive one, and the country at large is most friendly to the horseless wagon. But perhaps the best way to impress the reader with my own enthusiasm is to tell him about my own individual experiences.

We started out, four of us, with the intention of getting somewhere by night, but we didn't much care where, as long as we had a good time. And I want to say right here that your motorist who always plans every stopping place ahead and gets there, willy-nilly, at the sacrifice of comfort and enjoyment of the tour itself, while he may keep his engagement with himself, loses the essence of the pleasure he has come to seek.

We went from Washington to Frederick. Those who wish to go from Baltimore will find a good pike all the way to Frederick, better, in fact, than the road we went over. From Washington to Olney, twenty miles over the pike leading from Seventh Street north, is as good as one could ask for, but from Olney to Ridgeville, twenty miles, there is something to be desired. The road is mostly clay,—in dry weather smooth enough, but even a week after a rain, somewhat rutty and sticky. But it is passable and not at all dangerous, and its small difficulty lends a pleasant contrast when you get on the pike at last. This pike is splendid in surface, but its builders had no mind for powerful cars, and have put several more



LOOKING DOWN THROUGH THE "GAP," HARPER'S FERRY, IN THE EARLY EVENING.

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BY THE WAYSIDE—AFTER A RUNAWAY

thank-you-ma'ams in it than it needed—I counted a hundred and ten from Ridgeville to Newmarket—four miles? I am hurrying over the trip to Frederick, a total of fifty-three miles, because, beautiful as it is in the pastoral effectiveness of the many well worked farms, the coloring of the trees and the placid loveliness of the slow, rolling country, it is but as an introduction to the grandeur of what lies beyond. But one more word,—while the road is reasonably plain, there are a few forks and turnings along which you can go astray—consequently, use your tongue. There is plenty of travel, and instructors are never wanting. Ask twice, anyway, and of white men, not negroes, or you may get sent the wrong way.

At Frederick, at the City Hotel, you can get a reasonably good dinner for the moderate sum of half a dollar, and gasoline in plenty and good quality of any one of several stove stores, within a block. Cylinder oil you should carry with you, as even if you can buy it along the way, its quality is not always to be depended upon.

We are now ready to start on the real trip. Previously we have paid double fare at the various toll gates, for a return trip, but from now on we pay single fare, expecting to come back another way. We roll out of Frederick to the north, and see ahead of us, a long way ahead, the mountains—the Alleghenies—the first range of which is the famous Braddock Heights, of Civil War memories. I have taken many, many tours, but nowhere in the East, not even in the Berkshires, can I recall anything so beautiful as this steady run to the mountains, looming larger and larger as we come near to them, and the ascent through the defiles and passes which have been civilized with good roads. Once on top of Braddock Heights, and like a bomb the view bursts on you. One minute you can see nothing ahead but more hill—the next you are over the crest and for miles and miles on either side, stretching away into the infinite distance, right and left is the Maryland country, which is so famed in song and story, the "My Maryland" of the Marylander. And beautiful it certainly is—miles and miles of rolling farms, broken with valleys and peaks, and ahead the second ridge of mountains, to cross which is to get into the Hagerstown valley. I have some pictures of this view, but what photograph, eight by ten inches, can show you the magnificence of the hundreds of miles of land from an elevation of fifteen hundred feet? Not mine, nor any one's, I think.



PSYCHE AT NATURE'S MIRROR—GETTING A DRINK AT A BROOK CROSSING THE ROAD

Well, now we go down, down, down, and then again we go up, up, up,—and this second "up" is an "up," sure, and only a machine with a willing disposition and no heart disease will make it at more than a crawl. We, in our beautiful forty-five m. p. car shoot over the steepest grades as if they were levels, but even this car pants at some of the climbs, and once or twice, and it is surely no disgrace to tell it, we slip into second speed for some unusually steep place which we cannot rush. We are over the mountains and sliding down to Hagerstown before we know it—no stunning view this time at the top, as the top lies between two peaks, but ahead the rolling country repeats itself, and here and there we see rocky formations—strays from the Harper's Ferry country, which is all rock. Hagerstown, thirty miles from Frederick, we make comfortably in time for supper, which at the Hotel Bolten is all you can ask for, and later, after an evening of rest and a hot bath, we sleep as we seldom do at home. Hagerstown can show you many surrounding points of interest, but you will not have time for much. What you can see, and should on no account miss, is the Pope-Tribune factory, a mile from the hotel, where you will find very pleasant people, glad to show you their plant and their product, and you will be properly amazed to see so typically a New England factory in so southern a place as Hagerstown.

But we want to get to Harper's Ferry, or somewhere, for supper, sometime, so we do not delay too long. And now for Sharpsburg and Antietam and a brush up to our history. Sharpsburg is 14 miles away, and the road is fine. Here, too, the tolls, from being twenty-five and thirty cents, drop to five cents, a welcome change. And there are not so many of them. Sharpsburg we have war country and mountains all the way. The road is on a slight ridge, and on either hand we see scenes we can not soon forget, and particularly when we think that here and all around, the hordes of gallant Lee threatened Maryland and Washington, and that from here at bloody Antietam, he was finally driven from the State, after which Lincoln fulfilled his vow to again proclaim the freeing of the blacks.

But here is a scene. Long before we get to Sharpsburg we come on monuments. Standing alone,—in cornfields, in meadows, pathless, unguided, they mark the loving tribute of some regiment, some corps, some one man, to other bodies of men, who marched



ENVY!

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and fought and bled and died at their sides. There is something singularly impressive in these memorials, something which appeals to the American, and makes him lift his cap and read reverently the simple, terse records of these other Americans who, now unnumbered and unnamed, fought so well and died so hard to preserve the Union. It brings before you as no history can do something of what that struggle must have been, and I know of no better way to enjoy a study of a Civil War history that to first go on one of the great battlefields.

Sharpsburg, through Bloody Lane, filled with interesting landmarks. Then, through any one of several roads, around the Battlefield, if you have time—and take time. But at any rate, go to the Burnside Bridge—one of four across which General Burnside had such difficulty in hurling his troops at the men of Lee, who, in moon-shaped formation, awaited the Union attack. But although on this bridge two hundred and fourteen officers and men were killed and wounded, the Unions won across, and it was the beginning of the end for Lee. For while Antietam is as yet a mooted battle—who won being a matter of prejudice—still it is undeniable that the Union fought against odds, and that Lee was driven from Maryland,



THE MAIN STREET OF HARPER'S FERRY, WHERE JOHN BROWN MARCHED. IT WAS THE ATMOSPHERE OF TIMES PAST THAT ARE NOT AMERICAN

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and if that isn't a win, even if your losses be greater than his, what is?

There are monuments without number here, and white-lettered, iron plates inscribed with history, everywhere. You can spend an hour, or a month, as pleases you. We spend half a day, then push on, through Sharpsburg to Shepardstown, 4 miles. These are awful miles, too, mud and ruts aplenty while they last. But they are few, and we get through safely and cross the bridge from Maryland to West Virginia, over the broad Potomac. From here we go to Halltown—it is the long way round to Harper's Ferry, but it means a fine pike all the way and its 6 miles do not seem long. We are a curiosity here, our Gabriel horn brings the country people scurrying to the doors, and, everywhere we see the signs that a motor-car is a novelty. We have to be careful about horses, but just a little caution is appreciated, and we have yet to have the first cross look or disgruntled word for any one, although we were the unwitting cause of one or two minor accidents, which occurred in spite of all our caution in stopping the engine and leading the scared animal by his terror. Sometimes it is the man who is scared—I have seen a wildly waving hand a quarter of a mile away, almost, and a whole family come tumbling out of the carriage—father on one side, mother on the other and a dozen of children from somewhere, and all lead the horse slowly up and past, and he, poor, tired beast, never noticing anything strange at all in the unusual sight of the motor-car!

Halltown to Harper's Ferry is mostly up hill, onto the Bolivar ridge. Here we go through historic Bolivar, and on a mile or two more to still more historic Harper's Ferry, where poor old John Brown had his brief day, his fort, and where his memory is preserved in tradition and a monument. We stop at the Hill Top House, a summer hotel on the very edge and front of a cliff, looking down on the river five hundred feet below, on Maryland Heights and Loudon Heights, on the wedding place of the Potomac and the Shenandoah, the sleepy little town, the several bridges and altogether one of the most stunning bits of scenery we ever saw. It is Jefferson's "American Switzerland." Up and down the river, every foot has been fought over and bled upon, every inch the historic spot on which one of the two sides was in camp, holding for watchful days a strategic position neither would vacate. But this is not a history but a tour I am writing. We have a shed in which to store the car, gasoline in plenty, a good supper, and a fine night's rest. We go to Jefferson's rock on the other side of the ridge, and see the Shenandoah—we stand on Sunset Hill in the morning and watch the mists rise from the river—we see the shrieking trains rush by and leave the echoes shattering themselves from rocky mountain to rocky mountain, long after the train itself is gone—we watch the clouds drift up and down the mountains and the smoke settle in strange formations on their sides—we take a picture or two in the old and long dead streets, which look like a foreign land, and then we cross the bridge to Maryland again, and start for home.

Through Weverton and Knoxville, we go, following the railroad, then strike off into the country along first-class roads with a little exception of two miles of clay, and finally get to Jefferson, 14 miles from Harper's Ferry. And from Jefferson to Frederick, 7 miles, we find the finest pike in the United States, smooth and level as a floor, not a rut or a thank you ma'am, and for six miles we fairly fly—doing them in eight minutes. And the toll is seven cents!

Had I space I could tell you many an amusing story of incident and accident, although none of the latter to us and our car. But what I want is not to tell you of the fine time we, as a party, had, but of the beauty, the comfort, the convenience, and the inexpensiveness of this, one of the most interesting of short tours one can take in the East. Hundreds of motorists come to Washington and Baltimore from the North and want to take trips. They go to Great Falls, eighteen miles; to Marlborough, twenty miles; to the National Park, a run there and back and through it of perhaps fourteen and think they have done the country. Here is one of several tours second to none in America, and little taken. I cannot say why, unless it is for lack of knowledge—for roads are fine, the country is beautiful beyond words (are you tired of being told that?), and the expenses are small. A garage at Hagerstown, a shed at Harper's Ferry houses the car, hotels provide entertainment and accommodations for the party, gasoline is always to be had, what more can any one want? The trip takes from a morning to the evening of the second day after, or longer if you spend more time in Hagerstown and Antietam, and when you finish it only the thought that it will not run away and that you can make it again prevents you from straightway doing it over.

AN AUTOBIOGRAPHY

Monday, Feb. 1st, 1906.—To-day they finished putting my parts together and tested me. They say that I am ninety motor-power, and every one at the factory is satisfied with me.

Tuesday.—I have just been "demonstrated" to a wealthy old man, named Graughter. He says he is a strike-breaker, or a stock broker or something like that. I ran beautifully, and he was delighted.

Thursday a.m.—The gentleman has purchased me, body and solar lamps, for $8,000. He has engaged a chauffeur for me. The latter has never before run a motor. He used to be a coal shoveler. I have just learned that my owner is a dealer in bullion—some sort of canned soup, I presume.

Thursday p.m.—Mr. Graughter took a spin in me this afternoon with a cranky, homely sort of a woman. She hardly spoke a word; merely said that he would have to buy her one like me, only bigger. Must be his wife.

Friday, 1 a.m.—Mr. Graughter and a gentleman friend waited for half an hour outside a fanny little door that said "Stage Entrance" over it. Two tall, pretty blonde young ladies with big chiffon veils came out and got into me. They were just lovely, and called my owner and his friend "Dearie" and "Pet," and other pretty names. They stopped at a place with bright electric lights in front to dine. When they came out again, they were awfully jolly, and drove me up Broadway at full whizz. We bumped into a cab and smashed it, but I was not hurt a bit. It seems that *Mrs. Graughter* was in that cab. She acted real angry, and shook her diamond fist at us as we drove off.

Friday Afternoon and Evening.—The Mr. has taken the Mrs. out twice to-day. She told him that she was going to keep tabs on him, and acts awfully grouchy and annoys him. I can't see why a man wants to take his wife out when there are such nice ladies as he had last night.

Saturday.—Hannigan, the chauffeur, took a lady friend out in me today. She is a domestic—a foreign domestic, I mean. We met an ice wagon and cut considerable ice. I had to be towed to the repair shop. Hannigan and the lady used an ambulance.

About a month later.—I have been in the shop several weeks. I break down every other block. The boss is going to try to sell me for three hundred dollars.

Following Monday.—I have a bad cold in my carburetor. Would not run.

Tuesday.—To-day the old man took me out to show me to his minister. He's trying to stick the reverend gentleman. I ran delightfully, and the minister wants to buy me. He is a sport.

Wednesday.—Have been sold to the clergyman. Graughter taught him how to run me. Minister took his daughter out with me and I broke down three times.

Thursday.—He has made a terrible mistake! He filled my water tank with gasoline and my gasoline tank with water. Oh, what indigestion!

Friday.—They pumped me out up at the garage. I am running once again.

Saturday Night.—They are trying to make me move away from the porch. It is quite dark. The pastor's wife is bringing a candle. I have a strange feeling that something is going to happen. Yes, I am sure that—!!!!! *** —— !!!!! ****

M. Worth Colwell.



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MOTOR-CAR LAWS

BY X. P. HUDDY

THE legislative regulation of motoring is of vital importance to motor-car owners and operators, not only from the standpoint of keeping within the law, but because every motorist has, or should have, a desire to see that these laws are fair and reasonable in their tendency to protect public safety. Prejudicial or otherwise discriminating legislation against motoring is to be condemned, and every effort should be made in maintaining the freedom of the road and to protect the road rights from measures imposing unreasonable hardships.

Legislation has, on the whole, been very fair in most of the States, in its interest for the public and the motorist. Only occasionally enactments have seemed to be grossly unreasonable and discriminating. The greatest complaint is concerning the oppressive execution of the laws by unscrupulous officers, rather than against the regulations themselves.

The purposes of the public highways are for all lawful means of transportation. Animal or muscular power has no exclusive or superior rights. The use to which the public thoroughfares may be put comprehends all modern means of carrying, including the electric railroad and the motor vehicle. A recent Indiana case correctly states that, "In all human activities the law keeps up with improvement and progress brought about by discovery and invention, and, in respect to highways, if the introduction of a new contrivance for transportation purposes, conducted with due care, is met with inconvenience and even incidental injury to those using ordinary modes, there can be no recovery, provided the contrivance is compatible with the general use and safety of the road. It is, therefore, the adaptation and use, rather than the form or kind of contrivance that concerns the courts."

The rights of the motor-car on the public ways are equal to the rights of pedestrians and vehicles drawn by horses. This has been judicially declared a number of times by various courts in the United States. But owing to the so-called element of danger in motoring, which really consists of nothing inherently hazardous, many of the State legislatures have passed enactments requiring the registration of motor-cars and the licensing of the owners and operators. Certain regulations have been passed as precautions of safety for the public. This, of course, the State has the authority to do under its police power, which authorizes it to enact laws for the safety and general welfare of the people, provided that the legislation does not transcend the provisions in the State and Federal constitutions. The reason assigned for the necessity of registration and licensing is that the vehicle should be readily identified in order to debar operators from violating the law and the rights of others, and to enforce the laws regulating the speed, and to hold the operator responsible in cases of accident. The legislatures have deemed that the best method of identification, both as to the vehicle and the owner or operator, is by a number on a tag conspicuously attached to the vehicle.

Many test cases in reference to motor-car legislation have already been decided. As a general rule, the regulations have been upheld by the courts, where the contention was against their constitutionality, on the ground of class or special legislation, discriminating against motor carriages and placing upon them restrictions and burdens not imposed upon other vehicles. All the decisions, however, have not been against the motorist, and in many of the cases the courts have recognized and sustained the motor-car's rights.

Probably the most remarkable case protecting the untrammeled freedom of the motorist was decided by the Illinois Appellate Court, in 1904. An ordinance of the city of Chicago required every person in charge of, or operating a motor-car upon any street in the city of Chicago to be examined by a board of examiners created by the ordinance, and to be licensed as an "automobile operator," for which license a certain fee was demanded. One owner and operator of a motor-car sought to restrain the enforcement of the ordinance by an injunction, and the court decided in his favor, holding that to compel one who uses his motor-car for his private business and pleasure only, to submit to an examination and to take out a license (if the examining board saw fit to grant it) was imposing a burden upon one class of citizens in the use of the streets, not imposed upon the others. This decision is emphatically a champion of motoring rights.



FOR GOING FASTER THAN THE LAW ALLOWS.

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The case apparently imposing the greatest hardship, which has been decided by an American State court, arose in California and was decided August 10, 1905. An ordinance of the board of supervisors of Marin County which, after prohibiting the use of motor-cars on certain parts of some of the public roads of the county and regulating their use in other respects, provided that no person shall run a motor-car on country highways between the hours of sunset of any day and of sunrise on the day following, and a violation of the ordinance was made punishable by a fine or imprisonment. A motorist was convicted of a violation of the provision, and he was sentenced to imprisonment. Habeas corpus proceedings were brought and the prisoner's discharge was demanded, on the ground that the ordinance was unreasonable, but the court held that the regulation was valid and reasonable. It would seem that this ordinance and decision are as near the limit that judicial logic and legislative power can go, and maintain the respect of the public.

All the legislation in this country, concerning motoring, is not quite so serious as the local enactments just considered. The various statutory enactments are exceedingly interesting from many points of view. Some of the provisions are really amusing. Thus the legislature of Kansas has shown its kindly feeling



PRESIDENT LOUBET OF FRANCE AND M. BERTEAUX IN THE FORMER'S C. G. V.

towards motoring by actually incorporating into its motor-car legislation a provision which is worth reading twice, as follows: "Nothing in this section shall be construed as in any way preventing, obstructing, impeding, embarrassing, or in any other manner, or form, infringing upon the prerogative of any political chauffeur to run an automobilious hand-wagon at any rate he sees fit, compatible with the safety of the occupants thereof; provided, however, that not less than ten or more than twenty ropes be allowed at all times to trail behind this vehicle when in motion, in order to permit those who have been so fortunate as to escape with their political lives an opportunity to be dragged to death; and provided, further, that whenever a mangled and bleeding political corpse implores for mercy, the driver of the vehicle shall, in accordance with the provisions of this bill, 'Throw out the life-line'"—Sec Kansas Laws of 1903, ch. 67, p. 113. Kansas is no doubt on the right road.

Some of the law periodicals are advocating more stringent legislation in reference to reckless motoring and the use of motor-cars on the streets. One who has studied and compared the legislation of the various States of the Union and of England, and the decisions handed down by the courts, and has considered well the legal status of the motor-car, would hesitate long before advising the enactment of drastic legislation which would also unduly restrict the rights of the careful operator. The New Jersey *Law Journal* of November last, in an editorial, makes the following assertion: "It goes without saying that it is now dangerous for anybody to undertake to drive a horse and carriage on the public highway where there are sharp curves, because in the most unexpected manner a machine is likely to come thundering around the curve and frighten the horse with its sudden appearing, or collide with the carriage, and this is done, often, in a few seconds of time." This journal further goes on to say that the proposition to do away entirely with motor-cars, or to elect to the legislature only such men as will pledge themselves to oppose all of the so-called rights of motorists, is impracticable, but that it is not impracticable to compel a reduction in the maximum of speed to, say, ten or twelve miles an hour, and to punish all who exceed the limit, or who guide the machine recklessly, by imprisonment as well as by fine; and concludes by asserting that it is now almost as dangerous to drive a horse vehicle about the streets of a city as it is to drive over the grade crossings of railways; perhaps more so, because, if there are not watchmen at grade crossings, the crossings at least occur so seldom that one is on the lookout for passing trains.

Is this statement in reference to the danger incident to motoring true? If it is, then we must acquiesce in the assertion that the motor car is a dangerous machine, and even ten or twelve miles an hour is too fast. The existing legislation in most of the States is sufficiently restrictive on motoring itself, for when the legislatures deal with motor-cars they are dealing with a lawful, useful, and most proficient form of conveyance. The importance of the motor-car should not be forgotten. Unreasonable and oppressive legislation should not be prompted because of the mere fact that accidents have happened caused by reckless persons and which could have been avoided by the exercise of the slightest care. The motor vehicle is not a dangerous machine.

Legislation against reckless motoring is, of course, desirable, but the prudent operator should not unnecessarily be restricted. The "English Motor-Car Act" contains interesting provisions in this respect, and that act is worth consideration by the State legislatures, as much so as many other valuable English statutes that we have adopted. The provision against reckless motoring makes it a criminal offense if any person drives a motor-car on a public highway "recklessly or negligently, or at a speed, or in a manner, which is dangerous to the public, having regard to all the circumstances of the case, including the nature, condition, and use of the highway, and to the amount of traffic which actually is at the time, or which might reasonably be expected to be on the highway."

This is a wise and sensible provision. It makes due care the test of all questions of prudent operation, having regard to the nature and condition of the road, the traffic and the circumstances of each particular case. The rate of speed, if within the limit, is immaterial if the motoring is done with prudence. The personal element of motoring is here regulated, while the machine itself is left unrestricted. This legislation is directly aimed at the chauffeur who has been the direct cause of prejudicial feeling against the motorist. England has in this statute delivered a blow to the careless operator, and has, at the same time, protected that chauffeur who is cautiously mindful of his duties and responsibilities to his employer and to the public. Let the United States study and follow the successful operation of the English enactment.

Uniformity of State legislation is always desirable in all branches of the law, where the conditions are the same. It is especially necessary where the subject of legislation extends beyond the State's jurisdiction and into and through other States. Motoring is decidedly a subject of this character. Not only is uniform motor-car legislation an advantage to the motorist, but the States would be benefited by it. A State judicial decision construing a provision of the law would have great force in another State as a correct exposition of the regulation, and unnecessary trouble and expense in litigation could thereby be avoided. The execution of the statutory provisions would also be more uniform and equitable, since each State would determine its procedure from the experience of other States. The legislation as it now exists possesses uniformity to some extent. The States have enacted many provisions in common, but there still exists plenty of room for progress and improvement in this matter.

The legislatures, as a general rule, have been solicitous in reference to the motoring privileges of non-residents. Under the provisions of many of the States, as will be seen from the chart published on the following pages, non-resident motorists may operate their machines in the State if the laws of the resident State have been complied with. Some of the States, however, have not had the kindness to extend this hospitality, and require registration and licensing from all. But there are certain privileges, immunities, and rights which the State is bound to afford to the motorist of another State and which the State cannot lawfully or constitutionally deny. The State has no power to enact legislation imposing greater restrictions or burdens on non-residents than those regulating resident motorists. The non-resident has a right to the equal protection of the laws and cannot be discriminated against by hostile enactments not imposed against the people of the State enacting the legislation. In this matter, however, the States have kept fairly well within the bounds of constitutional authority, and many of them have been courteous enough to extend greater privileges to the non-resident than to residents, by exempting the former from registration and licensing.

What may we expect from future automobile legislation? To answer this question, the proven defects of existing regulations, the conduct of motor-car operators and the increase of motor-car traffic must be considered. These, however, are not all the matters to be taken into account. We may expect regulations protecting the motorist. It is possible that the manufacture and construction of machines may have to be regulated to some extent. This will depend, of course, on the standard of construction maintained, with a view of protecting the safety of the occupants and others. Questions will have to be solved as they arise, and in order to obtain the most beneficial results for all parties, causes and effects should carefully be studied and both the State and the motorist should co-operate.



A TAIL-PIECE

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MOTOR-CAR LAWS

A Complete Table of State Motor-Car Laws Regarding Registration, Fees, Numbers, Lamps, What Non-Residents Must Do, Speeds, Penalties, etc.

	Registration	Fees	Numbers	Lamps	Non-Residents	Speeds	Penalties
Alabama	Probate judge of resident county.	25 cents; certificate not transferable.	None required.	No mention.	Same as resident	Eight miles per hour throughout state. Four miles per hour at dams and causeways not over 20 feet wide.	$20 to $100 for first offence; $50 to $200 for subsequent offences, or 30 days to six months' imprisonment.
California	Secretary of State issues number.	$2; certificate not transferable.	Number 3 inches high on rear of car, with abbreviated name of state not less than one inch high.	Two lamps, white lights, showing forward, with number of vehicle, and one red light reverse.	Registration number of own state sufficient temporarily.	Speed must always be reasonable. Ten miles per hour in populated districts; 18 miles per hour elsewhere in incorporated municipalities; elsewhere outside of such municipalities, 20 miles per hour; 4 miles per hour approaching and traversing dam, bridge, sharp curve, or steep descent.	First offence, fine not exceeding $100; second offence, $50 to $100 or imprisonment for 30 days, or both; subsequent offenses, $100 to $250 and imprisonment for 30 days.
Connecticut	Secretary of State issues number.	$1; no fees required for cars rented.	Number 4 inches high with initials of state in front and rear of car.	None required.	Own state number and initials sufficient if laws are similar, for 15 days in one year.	Speed must always be reasonable; 12 miles per hour in cities; 15 miles per hour in country.	$200 or under, or 30 days' imprisonment, or both, for overspeed, first offence; $500 or under or 60 days' imprisonment, or both, for subsequent offences; not over $50 for violating other provisions.
Delaware	Secretary of State issues number.	$2.	Number 3 inches high at rear of car.	Two white lights in front; 1 red light showing number.	Exempt for 48 hours.	Speed must always be reasonable; 10 miles at sharp curves and intersections in open country, 8 4-7 miles in cities, towns, etc.; 20 miles per hour elsewhere.	$100 or 30 days' imprisonment for illegal display of number; $50 or 20 days' imprisonment for racing or wagering; not to exceed $100, or 30 days' imprisonment for other offences.
District of Columbia	Qualify before Board of Examiners appointed by Commissioners for District of Columbia.	None required.	Number 3 inches high on rear of car, also initials "D. C." not less than 1 inch high. Not transferable.	Two in front at sides, and 1 in rear showing red and white, 1 hour before sunrise and 1 hour after sunset.	Own state credentials sufficient for 60 days.	Four miles per hour rounding corners in the city of Washington; six miles per hour at cross streets where there are car tracks; 12 miles per hour in city where there are no car tracks; 15 miles per hour in country.	$1 to $40 for each offence.
Florida	Secretary of State issues certificate.	$2; no time limit.	Number 3 inches long, 2 inches wide at rear of car. Must carry certificate of registration or permit.	Two lamps, between sunset and sunrise.	Exempt for 30 days with license of own state.	Four miles per hour at sharp curves, bridges, fills, and intersections; otherwise reasonable speed.	Speed violations: First offence, not more than $100; second offence, not less than $50, nor more than $100, or imprisonment not exceeding 30 days, or both; third offence, not less than $100 nor more than $250, or imprisonment not exceeding 60 days. Other violations, not exceeding $25 for first offence; not less than $25 nor more than $50 second offence; not less than $50 nor more than $100, or imprisonment not exceeding 10 days, or both, for subsequent offences.

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	Registration	Fees	Numbers	Lamps	Non-Residents	Speeds	Penalties
Illinois	No state provision. Local authorities should be consulted.	No state provision.	No state provision.	No state provision.	No state provision. Local authorities should be consulted.	Fifteen miles per hour, except where local laws provide otherwise.	$25 to $200, or imprisonment for not more than 3 months, or both, for overspeeding.
Indiana	Secretary of State issues number.	$1; no time limit.	Number 4 inches high on rear of car, and first 3 letters of state name 2 inches high.	No state provision.	Own state number if displayed sufficient.	Speed must always be reasonable; 8 miles in closely built portions of municipalities; 15 miles in other portions of municipalities; 20 miles elsewhere.	Not to exceed $50.
Iowa	Secretary of State issues number.	$1; no time limit.	Number 3 inches high with initials of state on rear of car, not less than 2 inches high.	One or more lamps showing white forward and 1 red light reverse.	Own state number if displayed sufficient.	Speed must always be reasonable; to miles in built-up sections; 15 miles in thinly built-up sections; 20 miles in country.	First offence, not to exceed $25; second offence, $25 to $50, or imprisonment 30 days.
Kansas	No state provision. Local authorities should be consulted.	No state provision.	No state provision.	One or more lamps with white lights one hour after sunset to one hour before sunrise.	No state provision	Speed must always be reasonable; 10 miles per hour in populated districts; 20 miles per hour elsewhere.	Not to exceed $100.
Kentucky	No state provision. Local authorities should be consulted.	No state provision.	No state provision.	White light in front and red in back when necessary before sunrise and after sunset.	No state provision	Speed must always be reasonable; 6 miles per hour at crossings, bridges, curves, or descents; 15 miles per hour elsewhere.	$10-$100.
Maine	Secretary of State furnishes two number plates.	$2; no time limit.	Number 4 inches high and word "Maine" 1 inch high at front and rear of car.	Lighted lamp one hour after sunset and one hour before sunrise.	Exempt, if at front and rear of car there is displayed number of own state license and name of state.	Speed must always be reasonable; 8 miles per hour in cities, towns, etc., except when greater speed is permitted; 15 miles per hour elsewhere.	Not to exceed $50 or imprisonment not exceeding 10 days.
Maryland	Secretary of State issues certificate.	$1; no time limit.	Number 3 inches high in conspicuous place.	Two lamps with white lights showing forward, and 1 red light reverse.	Non-residents must register.	Six miles per hour at sharp curves, intersections of prominent crossroads in open country, or on highway passing through built-up portion of a city. Elsewhere to miles per hour.	Violation of number provision, $50 or 30 days' imprisonment; violation of lamp provision, $20; violation of speed provision, $25 to $50.
Massachusetts	Mass. Highway Commission furnishes license for operator and registers cars. Certificate must be carried in car.	$2 for registration and $2 for license, 50 cents for renewal. Private operator's license continued indefinitely; chauffeur's license good for one year.	One number in front and one in back, each 4 inches high.	One lamp on each side with white lights. Lights with registered number thereon	Exempt for 15 days; must then conform to laws of state.	Ten miles per hour in cities; 15 miles in country; 8 miles per hour at curves and intersections, and must always be reasonable.	First offence, not over $25; second offence, not over $100 for subsequent offences committed within year; $100 or 10 days' imprisonment, or both, for running after license has been revoked.
Michigan	Secretary of State issues seal and certificate.	$2; no time limit.	Number 3 inches high conspicuously displayed, also name of state in full or abbreviated one inch minimum.	Two lamps with white light in front, one red light in rear.	Registration number of own state sufficient if law is same.	Speed must always be reasonable; 8 miles per hour passing business or portions in corporate limits of all cities; 15 miles per hour in other portions; elsewhere, 25 miles per hour.	First offence, not to exceed $25 and costs, or imprisonment 10 days; second offence, not to exceed $50 and costs, or imprisonment 30 days; subsequent offences, not to exceed $100 and costs, or 30 days' imprisonment or both.
Minnesota	State Boiler Inspector issues license.	$2; no time limit.	Number 4½ inches high on rear.	At least one lamp.	Same as resident.	Four miles per hour at crossings; 8 miles per hour in built-up sections; 25 miles per hour elsewhere.	Misdemeanor, under criminal laws of state, no special penalty provided; general laws provide imprisonment not more than 3 months, or fine not over $100.

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	Registration	Fees	Numbers	Lamps	Non-Residents	Speeds	Penalties
Missouri	License Commissioner or County Clerk issues license.	$2 per annum.	Number in conspicuous place.	Two lamps in front containing numbers 3 inches long.	No state provision.	Nine miles per hour.	$100 to $1,000, or 30 days to 6 months' imprisonment, or both.
Montana	No state provision. Local authorities should be consulted.	No state provition.	No state provision.	No state provision	No state provision.	Eight miles per hour within limits of city, fire district, or thickly settled or business parts of towns; 20 miles elsewhere.	Not to exceed $100, or 60 days' imprisonment, or both
Nebraska	Secretary of State issues seal.	$1; no time limit.	Number 3 inches high on rear of car; initial and terminal letters of state not less than 2 inches high.	One or more lamps forward, white lights, one hour before sunrise and one hour after sunset; one red light reverse.	Number of license and initial of own state sufficient.	Speed must always be reasonable; 10 miles per hour in built-up portions of cities, towns, or villages; other parts of cities, towns or villages, 15 miles per hour. Elsewhere, 20 miles per hour.	First offence, not to exceed $25; subsequent offences, $25 to $50, or imprisonment for 30 days.
New Hampshire	Secretary of State furnishes two number plates; certificate must always be carried.	Registration fee $3. $1 for operator's license for one year.	Two numbers 4 inches high, on front and rear, followed by "N. H."	Two lamps required containing number not less than 1 inch high.	Exempt, subject to speed regulations and to suspension of right by Secretary of State.	Eight miles per hour in business districts, compactly built sections of cities, or towns. Elsewhere 20 miles per hour.	First offence, not exceeding $10 and costs; subsequent offence, not exceeding $50 and revocation of license; operating after withdrawal of license, not exceeding $100 or 30 days' imprisonment, or both.
New Jersey	Secretary of State issues license.	$1 for each car used; dealer's license fee $10.	Number 4 inches high at front and rear of car.	Two lights forward containing number not less than 1 inch high, and 1 red reverse, 1 hour after sunset to one hour before sunrise.	Must procure license.	Speed must always be reasonable; 20 miles per hour.	Not exceeding $100 or imprisonment for 30 days for fictitious number; failure to obtain license, $50; failure to display number, $15, unless wilful violation, in which case the penalty is $50; lamps, $10; speeding, $50; in default of payment imprisonment not exceeding 10 days; subsequent offence, double penalty or imprisonment not exceeding 10 days, in default of payment. Subsequent offences for speeding, imprisonment may be inflicted not exceeding 10 days.
New York	Secretary of State furnishes seal.	$2 for owners, chauffeurs, manufacturers. Renewals $1. for owners and chauffeurs; 50 cents for manufacturer's duplicates. If car is sold certificate must be returned.	Number on back of machine, 3 inches high, also initial letters of state not less than 1 inch high.	Two white lights showing forward with number not less than 1 inch high, and one red light showing backward.	Own state number sufficient.	Speed must always be reasonable; 8 miles per hour in business and built-up portions; 15 miles per hour where houses average less than 100 feet apart; 20 miles per hour in country; 4 miles per hour at curves, bridges, and steep descents.	Speed, fictitious number, display-ment of numerals, registration of chauffeur and violating local regulations, not more than $100, first offence; $50 or not more than $100, or imprisonment not over 30 days, or both. for second offence, not less than $100 nor more than $250, and imprisonment not exceeding 30 days. for subsequent offences; violations of other provisions not more than $25 first offence; second offence, not less than $50 nor more than $100, or imprisonment not more than 10 days, or both.

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	Registration	Fees	Numbers	Lamps	Non-Residents	Speeds	Penalties
North Dakota	No state provision. Local authorities should be consulted.	No state provision	No state provision	At least one lamp during hours of darkness.	No state provision.	Eight miles per hour within any city or village; 15 miles per hour while outside city or village; 4 miles per hour at crossings or crosswalks when any person is upon the same.	$5 to $50 or from 5 to 30 days' imprisonment, or both.
Ohio	No state provision. Local authorities should be consulted.	No state provision	No state provision.	One or more lamps with white lights in front, red light or lights in rear, one hour after sunset and one hour before sunrise.	No state provision.	Speed must always be reasonable; 8 miles per hour in business and closely built-up portions of any municipality; 15 miles per hour in other portions of municipality; 20 miles per hour elsewhere.	$5 to $50.
Oregon	Secretary of State issues certificate.	$3; no time limit.	Number, preceded by "Ore.," 3 inches high, must be carried on back of car.	At least one lamp showing white in front and red rear, number must be on white glass.	Same as resident	Eight miles per hour within thickly-settled or business sections of villages or cities; 8 miles in country when within 100 yards of any vehicle drawn by horses, 4 miles per hour at crossings, when any person is upon same; outside of cities and villages 24 miles per hour.	First offence, not exceeding $25; second offence, not exceeding $60; subsequent offences, not exceeding $100.
Pennsylvania	State Highway Department issues license.	$3; good for one year.	Number 5 inches high to be carried in front and rear of car.	Number at back to be illuminated one hour after sunset. One white light showing forward and one red light showing backward.	Same as resident.	Ten miles per hour in cities, boroughs, counties and townships; 20 miles per hour outside cities or boroughs, etc.	First offence, $10 to $25 or 10 days' imprisonment in case of non-payment; subsequent offences, $25 to $100, or 30 days' imprisonment, and license revoked for 6 months.
Rhode Island	Secretary of State issues certificate which must be carried in car.	$2 for owners; $10 for manufacturers and dealers. No time limit.	Number 3 inches high to be carried on back.	Such lights as the Secretary of State approves.	Own state number sufficient.	None stated, but must operate car at safe speed and stop motor if necessary to prevent accidents.	Not to exceed $20 or 3 months' imprisonment for any violation.
South Carolina	No state provision, Local authorities should be consulted.	No state provision.	No state provision.	White light in front and red light in reverse direction, at night and in fog.	No state provision.	Speed must always be reasonable; 6 miles per hour at intersections, bridges, curves or descent. Otherwise 15 miles per hour.	$10 to $100, or imprisonment for not more than 30 days.
South Dakota	Secretary of State issues seal.	$1; no time limit.	Number 3 inches high on back; also letters "S. D." not less than two inches high.	One white light showing forward, one red light showing backward; number not less than 1 inch high.	Own state number sufficient.	Speed must always be reasonable; 10 miles per hour in closely built-up portions of cities or towns. Other portions of cities or towns, 15 miles per hour; elsewhere 20 miles per hour.	First offence, not exceeding $25; subsequent offences, $25 to $50 or imprisonment for 30 days.
Tennessee	Secretary of State issues certificate.	$2 to Secretary of State for certificate and $1 to County Clerk for filing same.	Number 3 inches high in front and rear,	No state provision.	Same as resident.	Twenty miles per hour; municipalities have authority to lower maximum.	$25 to $100.
Vermont	Secretary of State issues certificate.	$2; good for one year.	Number 4 inches long to be plainly displayed.	Such lights, with numbers, as the Secretary of State prescribes.	Exempt, subject to speed limitations and regulations of Secretary of State.	Ten miles per hour within city or village or thickly settled districts or fire districts; outside, 15 miles per hour; 6 miles per hour at intersections and curves.	First offence, not more than $20; subsequent offences, not more than $100 or imprisonment for 10 days; for operating car after revocation of license, $50 to $200 or imprisonment for 10 days, or both.

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	Registration	Fees	Numbers	Lamps	Non-Residents	Speeds	Penalties
Virginia	No state provision. Local authorities should be consulted.	No state provision.	No state provision.	No state provision.	No state provision	Fifteen miles per hour. If a vehicle preceding car stops, car must pass at rate of 4 miles per hour	$10 to $100.
Washington	Secretary of State issues certificate.	$2; good for one year. renewal fee, $2.	Number 4 inches high on rear preceded by "Wn."	At least one white light showing forward and one red light to the rear. Number must be on white glass.	Own state number sufficient.	Speed must always be reasonable; 12 miles per hour with in thickly settled or business portion of any city or village; 24 miles per hour in country; 4 miles per hour at crossings	Not to exceed $100.
West Virginia	State Auditor furnishes tags.	$1. good for one year	Number must be on front and one on rear of car.	No state provision	Same as resident.	No state provision.	$5 to $25 for destroying tag of another; $20 to $100 for driving without tag; operating without license, $20 to $100, or imprisonment not more than 3 months.
Wisconsin	Secretary of State issues certificate in duplicate one of which must be carried in car.	For owner, $1; for manufacturer, $5 for general registration.	Number 3 inches high to be carried on rear of car, followed by "W."	At least one lamp showing forward.	Own state number sufficient.	Twelve miles per hour within corporate limits of any city or village; 25 miles per hour in country.	$10 to $50.
England	Registration with council of county or county borough which assigns numbers.	20 shillings, except 5 shillings for motor-cycles.	Mark, indicating number and council, fixed on car or drawn vehicle, or on both, in manner required. Special provision may be made for dealers.	No general provision.	No provision.	Must always be reasonable; 20 miles per hour; within place regulated by local government board, to miles per hour.	Speeding: 1st offence, £10; 2d offence, £20; subsequent offences, £50; where not specially provided, £20; subsequent offences, £50 or imprisonment not more than 3 months. Failure to show license, £5.



BARNEY OLDFIELD IN THE PEERLESS GREEN DRAGON RACING ACROSS THE STAGE OF THE BROADWAY THEATRE, NEW YORK, IN THE "SHOW" "THE VANDERBILT CUP."

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An American Motorist Abroad



BY SPENCER BORDEN JR.

TO the enthusiastic motorist nothing is so delightful as a trip through Europe. The scenery is beautiful, the people interesting and friendly, and the roads perfect. I was so fortunate as to have made a tour in Italy and France this spring, and it will no doubt be of interest to other motorists to know my experiences.

The first question which comes to the person who contemplates such a trip is of course the motor-car. Some advise purchasing a car to be delivered in Europe, but this is much more expensive than taking one from America. I bought an American car and shipped it abroad. My car, a Locomobile, was created and turned over to Cooks, who agreed to land it in Naples, to look after the freight, etc., and have a man meet me when the steamer came in. I stipulated that the car must be on the boat with me. As I cannot speak Italian, Cook's man took entire charge in Naples and cleared the motor car at the custom house, and also obtained my license to operate a car in Italy. All this was very simple as I had the advantage of having become familiar with the operation of the car before leaving home. If I had purchased a foreign car, I would have had either to sell it at a considerable sacrifice on the completion of the tour or to bring it back to America and pay the consequent heavy duty. A foreign car can come in free of duty only if the person importing it has owned it for one year.

A TYPICAL ITALIAN STREET IN A SMALL VILLAGE





FRENCH ROADS OFTEN RUN FOR MILES IN A STRAIGHT LINE





THE ROADS OF FRANCE ARE THE FINEST IN THE WORLD

My luggage which consisted of three large bags was carried mostly on a rack behind the tonneau. It is quite necessary to have a tarpaulin cover over all as in pleasant weather the dust, of a consistency of flour, is most penetrating; and, moreover, during rains it keeps the things dry. I carried two extra inner tubes and one outer case, strapped on the side of the car. These seemed sufficient, as one can procure tires almost anywhere. I also carried spare spark plugs, an extra chain, a few bolts and cotter pins, none of which I found occasion to use. I also took with me an English lunch basket, which proved very useful, as we found it very pleasant to stop for lunch at some spot which took our fancy, and not be obliged to get to any town.

Before leaving the United States I joined the Touring Club of Italy and the Touring Club of France, a matter very easily arranged by application to the respective secretaries, and the payment of a few francs. The membership cards in both these organizations are very useful at times, entitling one to a special discount at certain hotels in most of the large towns, and to a discount at the official garages. In this way one can save many times the membership fees. Monthly publications and road maps also are obtainable by members.



A TUNNEL SECTION OF THE CORNICHE ROAD ON THE WAY TO MONTE CARLO

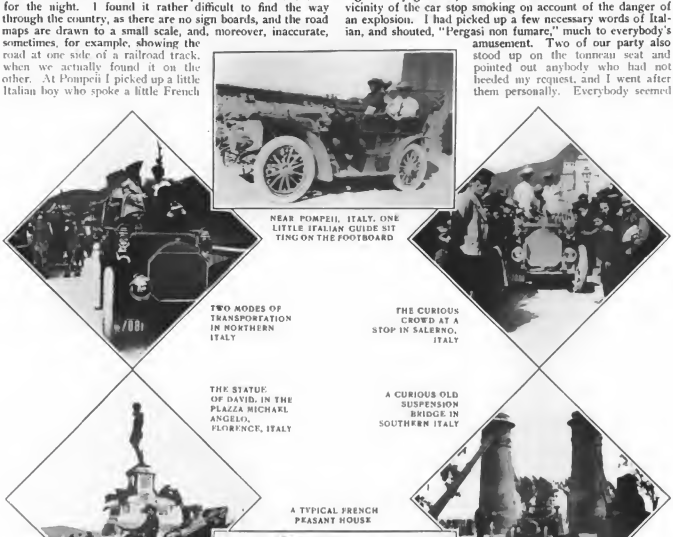
ITALIAN TOWN STREETS ARE OFTEN ALMOST TOO NARROW FOR EVEN ONE VEHICLE TO PASS THROUGH

There were four in our party. I took no chauffeur, preferring to look after the car myself. We landed in Naples on a beautiful day in the last of April. As soon as the custom formalities were complied with, the Italian government requiring a deposit of 110 francs, we uncrated the car, procured gasoline, and ran to a garage. The streets of Naples are quite crowded, and the small open carriages drawn by wiry little horses dash about at a great rate, so that one must keep on the alert. The garage proved to be well-managed and excellent. It was an official station of the Touring Club of Italy. I found no one who could speak English, but managed to make myself understood in very poor French.

After three or four days of sight-seeing in Naples, we set out on our travels. Having filled our tank with benzine, as gasoline is called in Italy (which, by the way, is very

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expensive, costing about four times what it does in the United States) we left Naples, skirting the bay southward, for Pompeii, to reach which we passed through several small Italian towns whose streets, paved with large blocks about eighteen inches square, were extremely narrow. There are no sidewalks, and we could almost touch the houses at each side of the street by leaning out of the car. Everybody lives in the streets and children are everywhere. I was always relieved when reaching the open country, after passing through an Italian town. We lunched in Pompeii and continued to Cava for the night. I found it rather difficult to find the way through the country, as there are no sign boards, and the road maps are drawn to a small scale, and, moreover, inaccurate, sometimes, for example, showing the road at one side of a railroad track, when we actually found it on the other. At Pompeii I picked up a little Italian boy who spoke a little French and said he knew the roads. He sat on the floor of the car with his feet on the step, and for three days he went about with us, and proved very useful.



NEAR POMPEII, ITALY. ONE LITTLE ITALIAN GUIDE SITTING ON THE FOOTBOARD

TWO MODES OF TRANSPORTATION IN NORTHERN ITALY

THE CURIOUS CROWD AT A STOP IN SALERNO, ITALY

THE STATUE OF DAVID, IN THE PLAZZA MICHAEL ANGELO, FLORENCE, ITALY

A CURIOUS OLD SUSPENSION BRIDGE IN SOUTHERN ITALY

A TYPICAL FRENCH PEASANT HOUSE

Cava, our first stopping place was most attractive, the entrance to the hotel being through an avenue entirely overhung with wisteria in full bloom. The hotel was built hundreds of years before, and had been the abode of some noble Italian family. On a tall sided rock high hills topped at one point with an old ruined castle which had served as a lookout to guard against surprises by the Saracens. On another hill was a monastery. Three days were spent in touring through this vicinity, our route being through Salerno, Amalfi, Meta, Castlemere, and back to Naples. The roads were excellent and, while the assents were long, the grades were not severe. The road from Salerno to Amalfi is particularly striking—a winding road along the face of the cliffs overhanging the Mediterranean, and passing through little white villages which look as if they had been thrown at the hillsides and stuck there. There are some very sharp turns, and great care was necessary in rounding them. The tourist should not fail to stop at the old Capucian Monastery at Amalfi, now a hotel, if only for lunch. It is most attractive, with its pergola, roses, and orange trees.

We had amusing experiences taking on gasoline in Italian towns. As soon as the motor stopped, we were immediately surrounded by every description of man, woman, and child. It seems to me there must have been hundreds—I am sure there were on one Sunday morning in the piazza at Salerno. All the men in the crowd smoked cigarettes, and before pouring out any gasoline, I had to make those in the immediate vicinity of the car stop smoking on account of the danger of an explosion. I had picked up a few necessary words of Italian, and shouted, "Pergasi non fumare," much to everybody's amusement. Two of our party also stood up on the tonneau seat and pointed out anybody who had not heeded my request, and I went after them personally. Everybody seemed friendly, however, wherever we went.

From Naples we went north to Rome, 140 miles over indifferent roads. Instead of going the whole distance in one day, we stopped for the night 20 miles south of Rome, at one of the hill towns surrounded by a wall on the top of a steep hill, and we had to climb up to it on the low gear. The next morning our route led along the Appian Way straight as an arrow into Rome, about an hour's run.

At Rome, I found a garage as good as the one at Naples, and the car was excellently cared for, always clean and the brass bright when we took it out for a run about the city or through the neighboring campagna. A nice excursion from Rome is out to Tivoli and the ruins of Hadrian's villa. In Rome, by the way, the rule of the road is to the left, and, until we became used to it, we had some narrow escapes.

After a week's sight-seeing, we set out for Florence, via Perugia. It is a two days' trip, the break being at Perugia. The roads north of Rome are much better than to the south

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and leave little to be desired. The grades are easy, and apparently there are no speed laws. We could go as fast as we liked. Between Naples and Rome we had had several unpleasant experiences running over dogs, pigs and chickens, but in Rome we bought a whip with a long lash, having noticed another touring party with one. It proved most effective. When a dog started for the car we hit at him, and usually he stopped at once. In fact, quite often a dog would stop in his tracks at sight of the whip. When we were about twenty miles from Perugia we got pretty low on gasoline, and on inquiry found that the nearest place where it could be procured was at Todi, a little walled town, situated at the top of a very steep hill. Inside the city gate the narrow street went up to the piazza at an awful grade. We did not know whether we could manage it, as our gasoline was so low in the tank that I was afraid it would not run to the carburetor. The result was all right, however, and after filling our tank we went down again, everybody, excepting myself, on foot, and holding back as much as possible. The run from Perugia to Florence is one of the pleasantest in Italy, over perfect roads, through vineyard after vineyard, winding around a beautiful lake, whose name I have, unfortunately, forgotten, up the valley of the Arno, to Florence.

Florence, of course, detained us a week, with its intensely interesting galleries and novel sights, its romance and its beauties. From here, finally, we took our route to Pisa, Genoa, and, over the famous Corniche road, to Monte Carlo and Nice. Florence to Pisa was made in a driving rain, but, thanks to our Samson tires, we had no trouble from skidding. These tires proved invaluable during our trip, as time and time again we found roads which were very slimy and slippery after a rain. Just beyond Pisa our road lay at the foot of the Carrara Mountains, where the famous marble quarries are situated. The great white sides of the mountains, where the marble had been laid bare, presented a beautiful sight. The bullock teams here have rutted the road badly in carting the heavy loads of stone. Soon we commenced to climb the mountains. The road was up and down all the way into Genoa. Good time could not be made, as the grades were very steep and the corners very sharp. Good brakes are a necessity, and ours had to be set several times. Genoa detained us only over night, as we were keen to reach France. About fifteen miles outside of the town—and, by the way, this proved to be the worst piece of road we found anywhere, being full of ruts, and on the day we traveled it a set of mud—we came to the Corniche road. It fulfilled all our expectations. The surface is perfect and the scenery grand. Skirting the blue Mediterranean, the motor-car dashes through tunnels, round sharp corners, rushes through little fishing villages, glimpses constantly being had of the snow-capped Alps far inland, until the land of roses and perfume is reached at Bordighera, Mentone and Monte Carlo.

Just before reaching Mentone the frontier of France is crossed. Here the Italian deposit is returned and one is paid to France. France requires rather a heavy deposit—636 francs in our case. We were very much pleased, however, to find the price of gasoline about half what it was in Italy. Just over the line in France there was a sign by the road instructing motor-cars to turn to the right when meeting vehicles. It was a comfort to be positive which way to turn when approaching a big car coming at a high rate of speed. The rule in Italy had been sometimes to the right and sometimes to the left, which resulted in "any old way."

Monte Carlo is beautiful, but one tires of it very soon if not interested in playing at the Casino. It was not long, therefore, before we were off for Geneva. We took *route nationale No. 4.* The French road maps are perfect, and it is much easier to find the way there than in the United States. Kilometre stones are everywhere. Every cross-road is plainly indicated by a sign-board, which states what the next town is and how far it is distant. The first house you come upon when approaching a village is usually marked with the name of the place, so there is no chance for a mistake. Also, if on a *route nationale*, one has only to follow the sign-boards. The motorist is warned of sudden turns, dangerous descents, railroad crossings, etc. The Touring Club of France has taken every precaution to prevent accidents and to assist the tourist. Our road turned inland just beyond Nice, and went over the Basses Alps, through Puget-Thernier, to St. André, between which points there is no railroad. The road goes up a mountain gorge, which, at the bottom, is almost in twilight, so steep and high are the cliffs on both sides. It is exceedingly lonely, there being only a few scattered hamlets and hardly any vegetation at the highest points. After St. André, the road descends again into a fertile country, through Digne. Here it mounts again and goes almost up to the snow line, through the pass of the Col du Hame Croix, to Grenoble. At Grenoble we crossed the river, went through Chambery, Aix-les-Bains, Annecy to Geneva. Evidently motorists have been in the habit of scorching through Annecy, for just before entering the town we passed under a sign going over the road in a sort of arch, warning all motorists to slow down to twelve kilometres an hour.

On entering Switzerland, the formalities are as elsewhere—a deposit is required that is returned on leaving the country. Switzerland requires 200 francs. The Swiss officials are very canny about this deposit. They were on the qui vive to stop us on entering the country, but, later, when we left, we passed the bureau of customs before we knew it, no one being in sight. Quite a delay was caused us in the collection of our 200 francs, which Switzerland was apparently quite willing to keep.

Everyone who has seen Switzerland knows Geneva, situated on the lake of the same name, and surrounded by the Alps, with Mount Blanc in the distance. We rested in this beautiful city almost a week, and then started for Paris. The road goes first to Gex and then commences to rise. Up, up, we went for almost two hours on the low gear, until we were at the top of the pass over the Jura Mountains, at the Col de la Foncille, almost 5,000 feet above the sea. There was snow at each side of the road and the wind was most penetrating. Once at the top, it was easy enough to run down the other side to sunny France. Here the conditions were ideal. It was warm and bright. There were no more mountain passes to cross, and the roads seemed as if they must have been sand-papered. Sometimes we would come on a stretch which was as straight as an arrow, and disappeared in perspective in the distance, lined on each side by tall, straight poplars. Again, we followed a tree-shaded canal, mile after mile. The motor-car seemed to catch the spirit of it, and we flew along. There were few teams in the country and few cross roads. Paris is considered a two-days' run from Geneva, the break being at Dijon.

We had been most fortunate on our trip, as we had had no breakdowns or serious accidents, and what seems still more incredible, we had had no tire troubles at all, there having arisen no need of even pumping up the tires. Such a trip as I have tried to describe is certainly one which a person who is fond of motoring can enjoy to the utmost. It brings you to places unfrequented by the average tourist. You see the people of the different countries in a way otherwise impossible. Moreover, it is not expensive. I am inclined to think it is cheaper than the railroad, and has the advantage of having your train start and stop at your own pleasure. It may interest some to know that it cost only $217 to run the car from Naples to Paris. This included gasoline, oil, cleaning and all garage charges.



AN ELOQUENT PLEA FOR "GOOD ROADS"

AN EXAMPLE OF WHAT OUGHT NOT TO BE

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ONE of the real fascinations of motor car touring is derived from mapping out and discovering the way for one's self. Such independence is afforded by no other means of travel, but one must have a liking for that sort of thing, as well as a natural aptitude, to make a success at it. The actual requirements, however, are few and simple.

To know in advance what tours are practicable, to be advised of the number and character of the facilities along the way, to be forewarned of any special dangers or of the vicious enforcement of unreasonable local ordinances, and to have suggestions of interesting side-trips, these and other bits of useful information are always worth while. Beyond these fundamentals, however, most of the material is of uncertain and questionable value. Some of it is actually misleading, which, of course, renders it one degree worse than useless. I have toured extensively both east and west for several years and have had more or less experience with various kinds of routes and touring information, and some fixed opinions have resulted.

Finding one's way is not a very difficult matter, either in a large city or in an ordinary country town. In the cities, the principal thoroughfares generally show themselves with very little trouble. Up-to-date garages are not hard to find, and it is a reasonable part of their special business to assist the stranger, whether a patron at the time or not. In the average small city or country town the ordinary passerby can be looked to (oftener than depended upon) for local directions. You simply have to "pick" your source of information and then "chance it." Prove what you learn in this manner by another inquiry if opportunity offers, but do not be surprised if the first two are proven wrong by subsequent developments. The most frequently met difficulty up to this point, in the city or in the country, is to get your informant to consider the special requirements of motor-car travel. Nothing is more confusing than the advice to "follow the trolley," which may soon leave every sign of highway behind for a private right-of-way. The quicker such things are forgotten the better.

It is in the real country, however, that the matter of traveling directions assumes its most interesting, and frequently its most serious, phase. As yet the motorist cannot go very far into the country in any direction without coming to the typical four-corners. It is still an exception to the rule where satisfactory sign-boards are to be found at such a point as this. Unless something unusual gives a clew to the proper direction to take the tourist may wait for half an hour—or half a day—until some farmer comes along who can advise him as to the right road to take, but who all too often has no liking for the new vehicle, and succeeds in compressing his idea of one straight-and-broad direction into about three words. After such an experience the motorist probably chooses some one of the roads as a venture, and perhaps travels a few miles before discovering that it is the wrong one. Under such circumstances it is generally necessary to return to the place where the original trail was lost and begin all over again. This is one of the "hazards of war." It is not often that the lack of a sign-board causes trouble. Sometimes the very presence of one is a deception, for the ordinary sign placed on a light board or piece of metal is easily reversed. Boys are very apt to play "All-Fools' Day" with some luckless driver.

Guide books for the use of motorists are not many as yet, but few of them seem to have found out the essentials—and particularly the non-essentials—of touring information. Really authentic data is a scarce article to-day, and even the best summing up of old material makes a curious hodge-podge. Sometimes the attempt is made to note everything in sight, in which case the time and care necessary to follow the guide book, step by step, would preclude the giving of attention to either the motor car or the scenery along the way. Whoever finds it necessary to proceed in this manner needs along with his guide book a professional chauffeur.

Meanwhile the thing most needed is accurate and succinct information of the distances between points, of the condition and character of the roads, and of the permanent points and landmarks along the way. These we shall have when a better conception is taken of what constitutes the essentials, and as soon as motorists, who know certain sections well, consider it their duty to furnish clear and concise information to the touring fraternity at large.



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HOW A MOTOR WORKS.

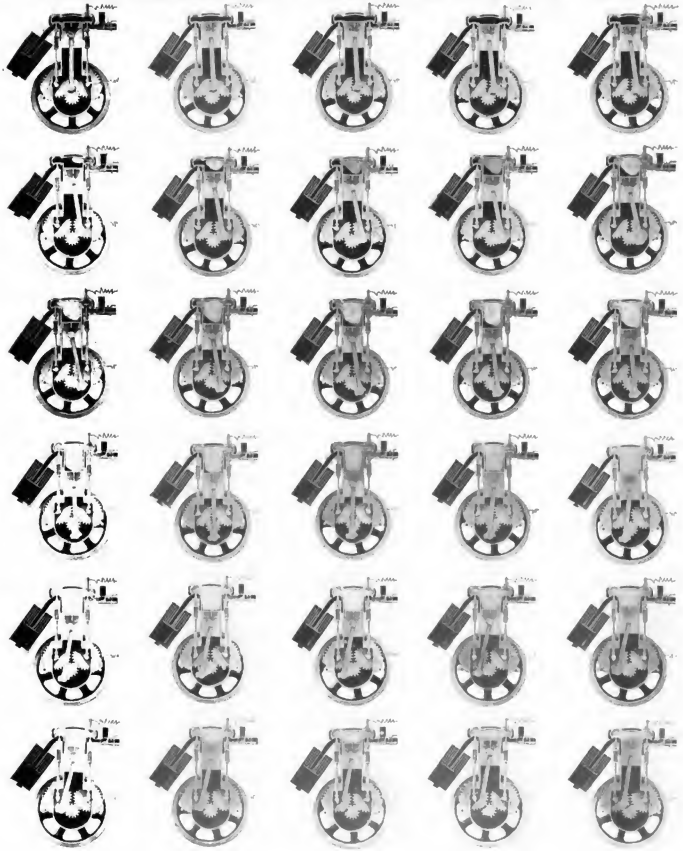
An Advertising Novelty at the New York Shows Which Shows How a Four-Cycle Motor, and Specifically a Reo Motor, Works.

THE first successful attempt to explain the operation of an ordinary four-cycle motor-car engine, in such a manner that its functions are perfectly clear and apparent to the layman, has developed in the form of a moving-picture thumb book, which was distributed by the Reo Motor-Car Company at the New York Automobile Shows.

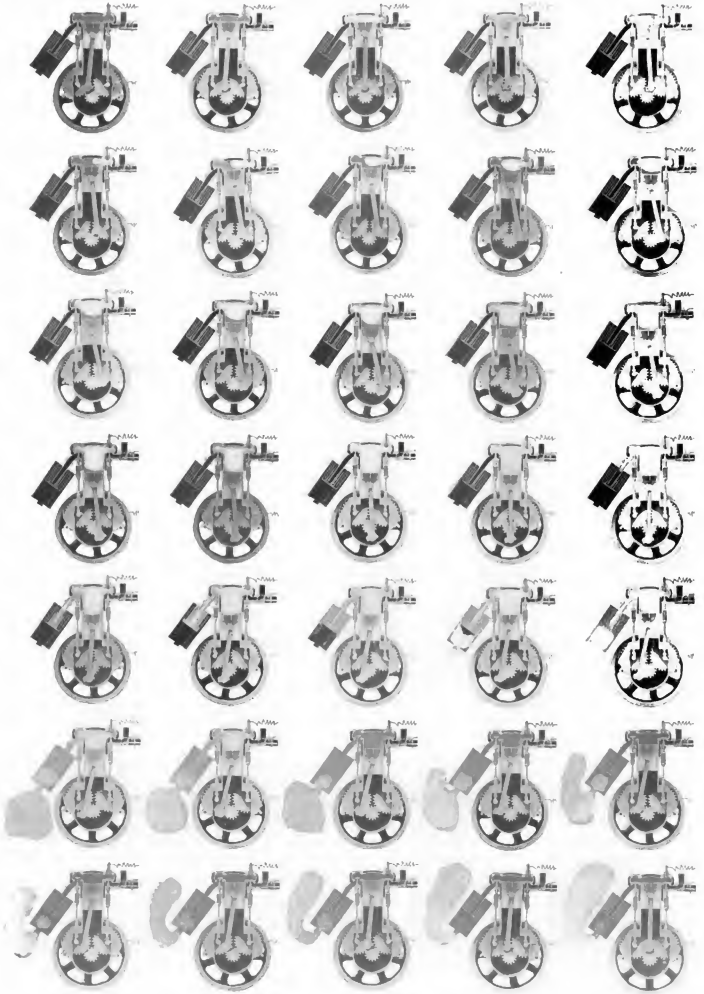
In the first picture the piston is shown in its highest position, at the commencement of a suction stroke. Succeeding pictures, from left to right, to the fourth row, show it slightly lower down, and the opening of the inlet-valve, and the incoming of the mixture, through the intake and from the atomizing nozzle, is very clear. To the fourth picture on the next page is the compression stroke—during which both valves are closed and the mixture gradually whitens as it is heated by the compression. The small spot of white between the terminals of the spark plug, immediately over the inlet valve, in the third picture on the next page, shows the commencement of the ignition. From the fourth row the pictures show the exhaust stroke, the exhaust valve being held open while the rising piston forces out the burnt mixture through the muffler.

To make a thumb book from these pictures, it is necessary only to cut them out squarely, assembling them into a pack in numerical order with No. 1 on top. Then, by holding the blank edge in one hand, by thumbing the right-hand edge rapidly over, the perfect appearance of motion is produced.

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TIRES AT THE SHOW.

The talk of the tires has never ceased from the first moment of the application of rubber in their construction and, though many and remarkable advances have been made, the cry is still for more. The public demand is for safety, and the ingenuity applied to securing it exceeds that applied to any other motoring problem. Important as safety is, however, there is another essential, and that is endurance, a want made more pressing by the increased price which the great demand for rubber has brought about; a reason likely to be considerably enhanced, when one takes into consideration the increased size of pleasure motor-car tires, and the fast approaching much greater demand which will come from the makers of business cars, the great bulk of which will, for some time to come, call for solid rubber tires.

The makers are fully aware of the needs of the public and of the motorist, and their exhibitions testify to a most laudable desire to meet them; no device is neglected, and much money is annually practically thrown away in experiments which, after all, have to be abandoned.

The 1906 tire is of larger dimensions, both in diameter and cross section. The novelties lay in the nature of the manufacture, in devices to prevent creeping, in improved methods of attaching and detaching, and in contrivances for the prevention of side skidding.

The Firestone Tire and Rubber Co., who have made a most enviable reputation with side wire solid tires, showed for the first time pneumatic tires varying in size from 26x2½ to 36x4½.

The body of the new tire is carefully made so that the different layers of fabric lie perfectly smooth, which is needful if every fibre of the fabric is to bear its share of work. The tires are vulcanized in open steam, which gives the rubber a toughness which cannot be secured by other methods. The process is necessarily a long, slow one, but it does away with the intense heating which is so injurious to any fabric, and which also prevents the perfect blending of the fabric and the rubber; hence the separation of the tread and the fabric, when united by the steam process, becomes impossible. The result is when the tread is worn out from real wear it may be replaced by a new one at a nominal expense.

A wire cable is inserted in each edge of the tire, the layers of fabric passing around these cables and holding the tires rigidly in place. Non-corrosive clips are riveted to the tires at regular intervals with rivets, which have large, smooth heads. The fellow bolts pass through these clips as well as the felloe and side flanges holding the tire firmly in place, it being noticeable that there are no lugs, stay bolts, or other obstructions to chafe the inner tube; neither can the flange bolts come off, as the air pressure in the tire forms a perfect lock nut. The edges of the tire are drawn so tightly against the rim that water cannot penetrate to the inner surface.

A special wheel is not required for the Firestone pneumatic tire, the flanges being made to flare outward with well rounded edges on which the tire may roll without rim cutting. The result is that the tires are mechanically fastened in such a way that the tire cannot creep or be crowded from the rim whether inflated or deflated. The tire is readily removed from the rim by using a socket wrench on the bolt nuts and withdrawing the side flange, then the case and the tube come off together and the whole operation requires only a few minutes. Of course to place the tire on one simply reverses the operation.

The Morgan & Wright "Clincher" tires of 1906 are a distinct advance. The tread is made of an extra tough stock, and is furnished with the Bailey "Won't-Slip" tread, which has stood the test of three seasons with marked success.

The Milwaukee Rubber Works Co. exhibited a new 1906 "Fawker" Clincher tire, which though not a pneumatic, is still not a solid tire, and by way of a demonstration they showed a set of tires which had traveled upwards of 2,500 miles and were apparently as good as new.

The Pennsylvania Clincher tires of 1906 presented no innovations and claimed none, except a new tire which will be known as the Racing Type.

It is patterned after the flat-tread tires which are now so extensively used abroad and which have proven superior to ordinary round tires in long-distance touring and racing.

The tread, on account of its shape, presents a uniform wearing-surface, so that it is considerably more durable than the ordinary tire, and its thickness prevents puncture to a large extent. The tread is provided with corrugations which are designed to prevent skidding, but even when these are worn smooth the tire grips the road-surface more firmly than the round tire, because the total weight is distributed uniformly over about three inches of the tread in its contact with the road, whereas in a round tire the greatest part of the pressure comes only at the middle portion of the tread. It is estimated that the flat-tread offers three times the resistance to skidding that the ordinary tread offers.



THE PENNSYLVANIA RUBBER CO'S NEW FLAT RIM RACING TIRE.

In use the flat-tread wears uniformly smooth and does not chip or become ragged as readily as does an ordinary tire.

The theory has been put forward that a tire of this type would detract from the speed of a car on account of its large bearing-surface creating a suction. That this is not true has been conclusively proven by a large number of racing cars abroad which have used this type of tire almost exclusively during the past year.

The Swinehart Clincher Tire & Rubber Co. exhibited their Swinehart tires for pleasure and commercial cars. They are solid, fit standard Clincher rims and can be applied at once. They are guaranteed, but their best guarantee is the 2,000 owners on whose machines they have been placed.

The Continental Caoutchone Co. show was of Continental pneumatic tires. They are made in Germany, but they found favor with many makers within the past two years of their importation, and have had many successes in speed contests.

C. J. Bailey & Co., of Boston, exhibited their celebrated "Won't Slip" tires, giving perfect control of the car on all conditions.

The Diamond Rubber Co. showed the Diamond Wrapped Tread tires in an original way. That is to say, they distributed a pamphlet showing the analysis of the tires used by a number of their tire users whose total mileage was 1,030,207 miles. The average mileage in the total named was found to be 7,154.0 miles. The singular fact of importance revealed by these reports and other records is that the experienced user of a motor-car generally has less tire trouble than the inexperienced. The reason is simple but sufficient. The car owner of experience realizes the need of giving his machine and equipment adequate attention.

The Diamond tread tires for 1906 are built upon the same lines as those of last year, but are actually better than ever before, inasmuch as every possible weakness has been eliminated. The tread is the toughest ever devised of rubber, and while much has been added nothing has been taken away. A feature of their exhibit was their new diaphragm or double inner tube, which consists of a tube within a tube, each tube having, however, its own separate valve, the valve of the second tube passing, of course, through the body of the first tube, the valves being located about a foot apart, the valve and immediate surrounding part of the second tube being vulcanized to the first tube to hold it in place so that when the main or outer inner tube is inflated the auxiliary tube by pressure of the air is forced against the base and not against the tread of the tire, so that it is unpuncturable. Should a puncture, however, occur in the main or outer inner tube, the second tube may then be inflated so as to hold the punctured first tube in place against the outer shoe.

The Hartford Rubber Works Co. has made many radical changes in its 1906 Clincher tire, produced for the first time by a one-cure process, and vulcanized in the same shape the tire assumes when in service; with strong Sea Island cotton fabric, and the edges or beads of the tire incased in asbestos to prevent rim cutting.

As in the Dunlop, a pure gum strip is placed between the outer ply of fabric and the rubber cover proper. This strip of pure gum is carried slightly above the breaker strip.

The most novel and thoroughly practical feature of the 1906 Hartford Dunlop tire is the floating ring, an endless band made of light metal heavily coated with zinc to prevent rusting. This band has sufficient allowance over the diameter of the rim at the tire seat to insure ease in placing the tire and floating ring on the rim in one operation, the ring being practically part of the tire.

When the tire is in place, its inside edges bear against the outside edges of the floating ring. Then when the metal bead is drawn down into the gutter by means of the turn-buckle, it wedges against the outer wall of the casing and prevents water entering the tire.

In addition to sealing the tire, this floating ring is in effect an endless lug without the latter's drawbacks. It is a positive non-creeping device. Should the tire be ridden flat, its edges rest lightly on the inner walls of the tire, holding the tire in position so that it cannot move or twist in the rim.

Tires fitted with this floating ring have been ridden flat for ten miles without damage to the tube, thus proving its merit.

The Hartford Dunlop tire is now vulcanized in a perfect circle at one operation—no fabric distortion under air pressure.

Forty per cent. stronger fabric is used, designed by their own weaving expert and made under his personal supervision.

A pure gum strip is placed between the outer ply of fabric and the cover proper. This strip of pure Para is carried up to and slightly above the breaker strip, and in combination with same effectually prevents shuffling or blistering, a common motor-car tire defect. This breaker strip also aids in resisting puncture.

In 1905 more than one-third of all the motor-cars built in this country were fitted with Hartford Dunlop Detachable Bead Rims. Time has proved that this rim was not only correct in theory but was thoroughly practical and a boon to the driver in case of puncture.

If through accident you cannot obtain a Hartford Dunlop tire, any standard make of Clincher tire, including the Hartford Clincher, can be placed on this rim by merely reversing the beads.

The principle of the new rim is the same as the 1905 Dunlop with the exception that the

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turnbuckle works from the under side, the groove or gutter in which the bead rests being cut out at one point to allow the turnbuckle to slightly protrude. The gutters themselves are made a trifle deeper than heretofore, which affords a more positive adjustment of the beads.

The Goodrich Quick Detachable tire is similar in construction to the regular Goodrich Clincher, but designed to be easily removed and applied without the aid of tools of any kind. This is accomplished by the use of a detachable ring provided with hooked ends which engage the rim proper through a slot.

These hooked or locking ends can be released from position in remarkably short time, freeing the ring from the rim and leaving practically a flat surface for the tire to slide over.

The ring is attached or locked to the rim just as easily and quickly as it is detached, the hooked ends engaging the rim slot almost automatically and in such a way that precludes any possibility of the ring working loose.

The Goodrich quick detachable construction provides a flap to protect the inner tube and guard against pinching; eliminates the use of lugs and clips; prevents creeping or becoming detached either deflated or inflated; employs no bolts, screws, or turnbuckles of any sort.

The rim has the advantage of being of the standard clincher type and is adaptable to the standard sized wheels.

A clear conception of the few locking parts, their relation to each other, and the particular purpose of each, can be obtained from the illustration and the description following:

A. A. Right and left locking hook of the locking ring which engage slot shown in rim.

B. B. Holds for engaging tool when applying ring.

C. Recess in ring for inserting tool.

D. Recess in rim for engaging ring preparatory to drawing ends together.

E. Valve hole.

F. Dowel pin to register rim. A small but very important factor. It must always be correctly centered else the ring will not lock. The correct centering of the dowel pin can be assured by starting the left locking hook flush with the edge of slot in rim.

G. Dust cap provided with a ratchet lock.

H. Lock or clamp which fits tightly against locking ends of ring (also see position at X on complete wheel and precludes the possibility of the locking hooks working out of position. This lock or clamp is in itself held in place by the screw dust cap which will not loosen in any service.

I. Curved end of tool used as a lever in slot to force ring out of locking position when detaching tire, and to slide under ring and around circumference of rim in order to release ring.

In attaching the tire this curved end is used to lift the last locking end of ring into recess D preparatory to drawing the ends together, also as a lever to force the right hand hook into position and flush with the other hook.

J. J. Prongs of tool which engage the holes B. B. in ring.

K. Canthook part of tool intended to engage the felloe of the wheel, thereby affording a powerful leverage against the side of tire when frozen to the ring or rim.

L. Point on tool to be used to clean out holes in ring should they become filled with mud, etc.

The Fisk mechanically fastened automobile tires exhibited comprised their three standards, the moulded type, the heavy car type, and their tire with the Bailey treads, and new red inner tube of superb quality.

The Goodyears had a new detachable tire, and the new Goodyear Universal rims, capable of being applied to their clincher tire, or any standard G. & J. clincher tire.

The G. & J. showed tires fitted with a flap so that no clamps are necessary, and the Dunlops, of which they will shortly be in a position to offer a new type which will have the well known turnbuckle style of fastening.

The Mitchell solid outer tire is about an inch thick on the tread. The inner tube is what many familiarly term a hose pipe. It is very strong and will withstand any pressure to which it may be subjected by the weight of a motor-car. Between these two, the outer casing and inner tube, is a solid rubber leg or plug made in sections, each overlapping, presenting what is practically a continuous surface to the inner tube. The under side of the leg is covered with leather that there may be no chafing of rubber surfaces.

The leg is held firmly in position by a metal clincher through the sections of which it moves up and down freely, but without the slightest friction. With this construction the weight of a car coming on the tread of the outer casing forces the rubber leg upward, compressing the inner tube. The motion results in great resiliency, while the inner tube, located as it is, three inches under the outer tire, cannot be punctured.

To strengthen the construction, the sides are enclosed with steel flanges which flare away slightly at the outer edges, obviating any possibility of rim cutting. These flanges are bolted through tire and clincher, fastening the whole firmly and making the tire positively secure against possibility of working loose or coming off. The steel flanges, it will be noted, prevent punctures from the sides.

The well known foreign rivals, the Michelin and the Continental, were there in all their glory, both of them showing metal treated anti-skid tires the same as they used in the Bennett and Vanderbilt races. The Gaulois and the Harberg, from France and Germany, were typical clincher tires of superb material and construction.

The International tire shown has an exclusive feature long used by them with great success. It consists of the fact that one ply of fabric never touches another, but rests for its cushion upon pure gum with the result of the greatest resiliency possible, and that the fabric plies do not chafe on each other. Internal friction and heat are reduced to a minimum and tires can be replaced when worn down to the very last piece of fabric. The tough tread is joined to a tire foundation by a cushion of Para gum above and below the breaker strip which absorbs the shock or pounding of tread on roads.

The International casings are not built with straight sides, which when inflated must take on a circular and radically dissimilar shape, but are the same in cross-section and in outline whether inflated or deflated, so that there is no unnatural strain at any time. The bead of these tires fits standard clincher rims naturally with the result that the inner tubes do not get pinched, and neither is rim cutting possible.

The Electric Rubber Manufacturing Co. showed their Panther heater-cured wrapped clincher tires, and an inner tube covered with a specially prepared expansible cloth covering permanently applied, which increases the strength of the tube at least fifteen times by test. It is well known that in removing a tire for any cause a tube is liable to blow out its weakest point unless it is entirely deflated, and when a puncture occurs the ordinary tube will frequently tear many inches from the point of puncture. All these experiences are entirely eliminated by the use of the Panther covered inner tubes.

Of solid rubber tires the leading exhibit was the Firestone, but excellent examples were shown by the Swinehart Tire Co., the Motz Tire & Rubber Co., and the St. John Rubber Tire Co. sent a solid cushioned tire with 3½ to 4½ inches of leather over the bead, and an inside rim of solid leather. These two rims rested on rubber cushions formed by the openings round the tires, the openings producing the required resiliency. The Kelly-Springfield Endless Tire Co. showed their tires and A. Dewes of New York exhibited "The Tire That Don't Come Off."

Leather-faced tires were exhibited by the Samson Co., and the Republic Rubber Tire & Shoe Co. sent their non-skid leather covers.

J. M. Delaney & Co. exhibited their "Healy leather covers" with which they cover either new or rubber tires with leather tanned under their own supervision; this leather cover clinches under the rim, making it impossible to peel at the edges, and it prevents rim cutting. It also takes the strain off from the rubber tire and places it on the rim.

The Samson Leather Tire is a light type of an ordinary rubber tire, to which a leather protection or bead is applied. An extra strip of leather is placed between the protector and the outside surface of the shoe to prevent the latter from the ends of the rivets in the bead. The "Type-Course" Samson tire is an unfailing safeguard against skidding.

One, and only one all leather tire was on exhibition, in which nothing but leather entered into the composition, and that was the "Mesinger."

This tire is constructed entirely of heavy oil-finished chrome-tanned leather are exceedingly tough and pliable. No rubber or fabric is used. The different layers are thoroughly cemented together with a waterproof cement. The tread is formed of leather disks, cut from heavy stock, each disk is fastened with three screws of special design, which are screwed with a cement into the solid leather. Puncturing is reduced to a minimum. The disks being screwed on, can be renewed when worn, by simply screwing on new ones.

Oil which is bad for rubber tires is very good



THE NEW GOODRICH QUICK DETACHABLE TIRE.

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for this tire. It is advised to rub the tire off with oil when dry. It makes the leather more waterproof and pliable, and being oil-finished it will not heat and chafe as rubber tires do, especially when the different layers of fabric become detached, and begin to chafe and rub the threads of the fabric through the casing A special constructed rim is furnished with these tires. The fastening of the tire to the rim is done by a steel band inside of the casing. This band is contracted or expanded by manipulating one nut on a toggle spanner. By this device the tire is held in place as in a vise. The steel band is covered with leather, which makes a smooth flat bottom for the base of the inner tube and being a flat base the tube cannot be injured if the tire becomes deflated while running.

One composition tire, the "Ever-lastic," resembling soft rubber, was on view. Ever-lastic is a composition resembling quite soft rubber. It is used as a filling to take the place of air in the tire.

While in its fluid state, it is forced into the tire under air pressure (30 to 150 pounds), till the tire is completely filled and the gauge stands at the desired pressure. After 48 hours it seasons into a mass and becomes permanently elastic like rubber itself.

It is not affected by traction of the wheel or by hot or cold weather. It lasts until the tire is entirely worn out, worn through the outer rubber and the several inner thicknesses of canvas.

Of devices for the prevention of side slipping there were, besides those applied by the various manufacturers to their own products, the "Burke climber" chain, made by the J. C. Brown Mfg. Co., the "Wallworks" patent of the Wells Light Mfg. Co.

The Weed Chain Tire Grip is easily applied to any wheel and it makes traveling safe in snow or over frozen or muddy or sandy streets.

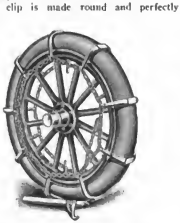
W. H. Wiley, Son & Co. sent specimens of their new tire case quickly and easily adjusted, and by lacing will fit any size of wheel tire.

"The Coat of Mail" is an envelope of rubber fabric and small steel plates that fits around a regulation tire like a glove and is vulcanized thereto, the armor getting all the wear and tear. This envelope is moulded to fit the tire exactly; the tread part is built up of five-ply Sea Island cotton fabric weighing 17 ounces and a Para rubber cover. The plates are of cold rolled steel 3/32 of an inch thick, so small in size that they flex easily. The case hardened riveted heads are slightly conoid and are countersunk into the plates so that even when worn the plates will not fall off. These rivets are so pointed that they will not tear the rubber or fabric as bifurcated rivets will. A strip of uncured unvulcanized rubber is placed underneath the rivet heads so as to protect the main body of the tire from them and to be vulcanized to the tire. The makers claim that rubber affords a better ventilation than leather, which is an inelastic material, and that this rubber covering is much cooler under the heat of traction than leather would be. The "Coat of Mail" adds about ten pounds to the weight, but as it is rolling weight, and not carried on the springs of the car it is not a factor since one is spared the expense, space, and weight of carrying extra shoes.

Among the non-puncturable tires shown was the familiar Voorhees tire, which is made in cushion, motor-car, and carriage tires.

The Burke climber shown by the J. C. Brown Mfg. Co., of Butler, Ind., uses two chains on each wheel and these chains are connected with a clip so formed that when attached they hold the chains clear from the spokes and rim of the wheel, being formed to fit the tire in such a manner that when the weight is put on the clip the tire is allowed to spread, thus making it run smooth over hard roads or pavement.

Each clip is made round and perfectly



THE J. C. BROWN CO. TIRE GRIP

smooth, which insures that they will not injure the tire. The climbers are put in a neat canvas bag with directions how to attach them. With each clip of the Burke climbers is furnished a ratchet wrench with which the chains of the climbers are quickly and easily adjusted, being also used to hold the regular drive chain together while a repair link is being put in, so that it is wholly unnecessary to shift the rear axle forward or to remove the chain from the car.

The climber itself stops the machine from



THE NEW MICHELIN NON-SKID

skidding and holds the machine in the road. It is equally efficient in sand, mud, snow, or ice. The climber gradually moves or changes around the tire while the wheel is in motion.

A new detachable tire protector is the Burnham, shown by the Diamond Rubber Co. It is built of a number of layers of friction fabric covered by a heavy layer of pure rubber on top of which are two layers of fabric, and then finally the tread itself. All of this material is firmly vulcanized together and in appearance does not differ from an ordinary tire. Its outer edges contain, however, side wires which are imbedded in the layers of the fabric foundation. The tire is held in place simply by power of constriction, the protector being laid over the tire, and the more the tire is inflated the harder the protector grips so it will not creep either at speed or when deflated. The tire protector is furnished in four different treads, smooth, the Diamond wrapped tread, the Bailey non-slip beads, Samson steel studded leather tread, and the Bar traction tread, which is a new form of tread having rubber bars crossing diagonally the face of the shoe but parallel with every other bar around the whole circumference.

THE BULLARD SPEED RECORDER.

THE Bullard speed recorder is made by J. H. Bullard of Springfield, Mass., and is so designed that it may be attached to the front of the car or to the steering post by a joint which allows adjustment at any angle to suit the convenience of the operator. The Bullard recorder is connected to the left front wheel by the usual flexible shaft.

It consists of a clocklike movement which indicates the hour and minutes, at the same time moving a paper dial or card at minute hand speed; this card is divided by twelve spiral lines that represent hours, and is also divided radially into sixty spaces, representing minutes. A perforating mechanism is also provided, operated by the wheel, that will make a perforation every quarter of a mile the car travels, and at the completion of every mile a deeper perforation is made for convenience of reading.

The car will contain a record for twelve hours from any hour of starting, and will show the exact time for each quarter of a mile, also showing when and how long any stops were made. At the top of the face of the instrument is an opening through which the hour in Roman characters is shown, and as the card passes around under it tells the minutes past the hour; these minutes being shown on the card and a central dial marked in figures 5, 10, 15, etc.

The card is read from the outside to the right towards the center, and when one perforation is in a space, or a minute line apart, it indicates one-fourth mile each minute, or fifteen miles per hour; if two are in a minute space it indicates 30 miles, and if only one perforation is in two spaces it is seven and one-half miles per hour, etc.

On the back of the card is a blank form that can be filled out, if the owner desires, giving the date, from and where to, the number of miles, fuel used, condition of the roads, number of passengers, etc., etc., which can be preserved for reference if desired.

The instrument does not depend upon the speed of the car to move an indicator-hand, but will record accurately any speed at which a car can be run, even if it were possible to go at the rate of two miles per minute. No part of the instrument revolves faster than the wheel, thus eliminating high speed and rapid wear of the parts.

Motorists not only like to know how far and how fast they go in their cars, but they also like to know sometimes, at what time a certain speed was made; and it is also exceedingly comforting, when confronted with police evidence to the effect that the car was running thirty miles per hour, to be able to produce a record clearly proving that the speed was, say, ten miles an hour.



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Diamond

NOTHING EXTRAVAGANT
NOTHING SENSATIONAL OR VISIONARY

Still

DIAMOND
WRAPPED TREAD TIRES
FOR 1906

Will make themselves as permanently felt as our Wrapped Trade Construction of 1905, which in a season made their name perhaps the most widely known and used descriptive term in the Tire and automobile trade.

THE DIAMOND RUBBER COMPANY
AKRON OHIO



AUTOMOBILE SHOW

Amidst the excitement attendant upon the opening of two of the largest automobile exhibits ever held, we pause to remind you of the fact that as manufacturers of

STANDARD
"Rims that are Right"

As specialists in ELECTRIC WELDING for Automobile Manufacturers, we desire the consideration of the trade because we can prove our right to it.

THE STANDARD WELDING CO
CLEVELAND

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MICHELIN TIRES

MICHELIN and MERIT

are synonymous terms

¶ The **best** in any line of endeavor is never an accident. It takes brains, skill and money to produce perfection. The tires of **Michelin**, the famous tire maker of France, are no accident. Our "Instruction Book" sent free upon request will tell you how they have been brought to their marvelous perfection.



Michelin Tires do not rim-cut

¶ Do not forget that fact! Its truth means your freedom your freedom from tire worry—and, consequently, your pleasure

Michelin Tire American Agency, Inc.

Sole American Representatives

6 WEST 29th STREET, NEW YORK

With Branches in all Large Cities of the United States

Telephone, Madison 760, 761

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TYPICAL OF GREAT STRENGTH

HARBURG TIRES

are the result of twelve years of steady endeavor and are successful in every way. They combine many qualities being

Practically Puncture Proof
Resilient Economical
Blister Proof
Safe from Blowouts
Insurance Against Troubles

If your car is heavy the HARBURG is the tire. If a light one the HARBURG will prolong its life.

The HARBURG is safe for it will not blow out and safe again because the rubber cannot separate from the canvas.

The Harburg Tire Company

1777 Broadway, New York
(Temporary Address)

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The universal praise given The Goodrich Quick Detachable Tire and Rim is to-day the most noteworthy fact in connection with the automobile tire industry.

No other quick detachable construction is so simple in its workings, or admits of such quick and easy handling of the tire in detaching and attaching.

No lugs, no clips, no pinching of the inner tube, no possibility of the tire working loose, no bolts, screws or turnbuckles of any sort.

Please write for special booklet.



The B. F. Goodrich Company

Akron, Ohio



NEW YORK
66-68 Reade Street and 1625 Broadway

CHICAGO
141 Lake Street

SAN FRANCISCO
392 Mission Street

BOSTON
161 Columbus Avenue

PHILADELPHIA
909 Arch Street

BUFFALO
731 Main Street

DETROIT
80 E. Congress Street

DENVER
1444 Curtis Street

ST. LOUIS
3926-28 Olive Street

CLEVELAND
416 Erie Street

LONDON, E. C.
7 Snow Hill

WANTED

A MAN WITH A NEED

If you want to buy anything, if you want to sell anything, if you want a Chauffeur or Mecanicien, if you want anything in the world of motoring, you want

MOTOR MESSENGERS

A little "Want Advertisement" or MOTOR MESSENGER in the next issue of MOTOR will give results to fit your needs.

In a few words, write your "want" and mail it to MOTOR with the price of the MOTOR MESSENGER at

5 CENTS A WORD

For advertisements received too late for classification see the last five advertising pages.

$1,000 TIRE ECONOMY COMPETITION.

DURING the past year the Pennsylvania Rubber Co., of Jeannette, Pa., has given considerable attention to the discussions which have arisen regarding tires. It does not believe that patent rims or airless tires will solve the problem of tire expense which is constantly before the motor-car owner. That this expense is considerable there is no doubt, for, from a large amount of data which it has collected from users of all kinds of pneumatic tires, the company believes that tire-expense averages approximately 35 per cent. of the total cost of maintaining a car.

No wonder the user looks eagerly for any improvement or device which may tend to decrease such a large item of expense. He is in error, however, if he believes that a good tire is in itself an expensive article to maintain if it receives the proper treatment. By far the largest percentage of tire trouble is caused by ignorance or carelessness in using and handling tires. Many drivers consider that running a few miles on a deflated tire is a matter of slight moment to the life of the tire. Few persons understand how to mount a tire properly on the rim, and scarcely anyone realizes the importance of having a tire bear no more than a certain weight. In allowing oil and gasoline to come in contact with the rubber they are equally careless.

In view of these facts and with the idea of educating the motorist in the proper care of tires the Pennsylvania Rubber Company offers $1,000 in cash prizes for a Tire Economy Competition to be held throughout 1906.

It is believed that a contest of this kind should serve as an incentive to motorists to familiarize themselves with the methods of handling tires which are best suited to preserve them.

The company will supply to all who enter the contest the most elaborate book on the care of tires ever published.

There will be nine prizes as follows: First prize, $500; second, $200; third, $100; fourth, $75; fifth, $50; sixth, $30; seventh, $20; eighth, $15; ninth, $10.

The prizes will be awarded at the end of the year to the owners or chauffeurs of the cars using Pennsylvania Clincher Tires which finish the year 1906 with the least tire expense per running mile. The competition will be held under the following

CONDITIONS.

Competitors may enter cars in the competition at any time during the year, but cannot hand in their records before the end of December.

The car must have traveled not less than 2,500 miles during the year.

The distance traveled must be measured by an accurate odometer.

No bands or protective devices of any kind may be used on the tires except that one band covering not more than 18 inches of the tread may be used temporarily if necessary on account of any injury to the tire.

Repairs must be charged at the rates charged by the company, and all repairs must be reported in detail at the close of the year.

Each competitor must notify the company of his intention of entering the competition and must give the number of miles registered by his odometer at the time of entering.

The proper blanks furnished by the company must be filled out and returned at the close of the competition.

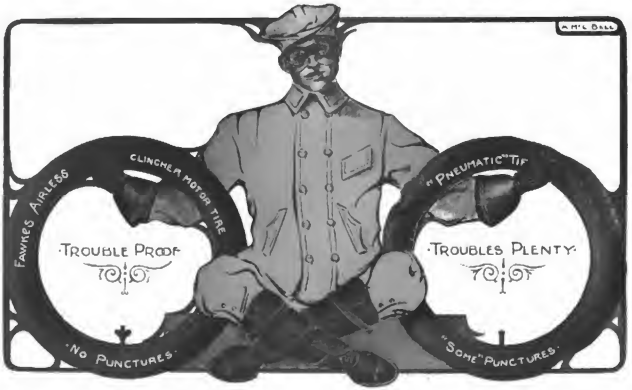
No entrance fee is charged.

In awarding the prizes the following data will be taken into consideration in addition to the expense per mile:

Weight of car.
Size of tires.
Total distance traveled.
General character of roads traversed.
Pennsylvania Clincher Tires and Tubes must be used throughout the competition.

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Which Do You Prefer !!



Fawkes Airless



Our new 1906 **FAWKES CLINCHER** tire is the sensation of the automobile world. THOROUGHLY TESTED, FULLY GUARANTEED. Fits *Standard Clincher Rim*. Orders coming rapidly. Send yours in quick. Will be rushed after the show.

CHICAGO AUTO SHOW, FEBRUARY 3-10, FIRST REGIMENT ARMORY, SPACE A82.

MILWAUKEE RUBBER WORKS CO.
Dept. M. **CUDAHY, WISCONSIN** (Suburb of Milwaukee)

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G&J TIRES

For the

SEASON OF 1906



ONE CURE WRAPPED TIRES
VULCANIZED IN OPEN STEAM
STRONG AND TOUGH
MOST DURABLE
HIGHLY RESILIENT

THE BEST TIRE MADE FOR AUTOMOBILE USE

Write us

G&J TIRE CO.

INDIANAPOLIS

Depots		Distributing Agencies	
Chicago	Cleveland	Minneapolis	Plent Bros.
Detroit	Denver	Portland -	Kenis & Co.
Boston	San Francisco	Los Angeles	Ranney-Hutchins Rubber Co
Buffalo	Philadelphia		

Motor Messengers Bring Results

¶One advertiser who used the classified pages of Motor Bureau, in the December issue, has received up to date (December 15th) 173 answers from 35 states and territories. ¶These prove conclusively that a Motor Messenger, announcing a second-hand car for sale at a reasonable price, will bring the desired results. ¶Answers for this same advertiser are still coming, (December 15) and the total number of replies will probably reach 200. ¶Look at the pages of Motor Bureau in this issue — then send in your advertisement.

For advertisements received too late for classification see the last five advertising pages.

A NEW FORM OF PNEUMATIC TIRE.

THE pneumatic tire has been aptly styled the "rail of the auto-car." Unfortunately, while improvements in the latter are being made every day, the progress effected in the rail is slow, notwithstanding the constant efforts of ingenious engineers.

The protests of the manufacturers of pneumatics against the ever-increasing weight of motor-cars appeared to forebode their approaching downfall; but M. Devenoye, of Paris, coming to the rescue, asserts that the inadequacy of the pneumatic is due especially

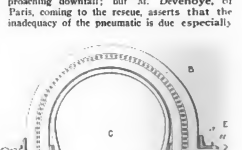


FIG. 1. THE DEVENOYE PNEUMATIC, SHOWING THE TIRE SET INTO THE FELLY

to the defective form of the tire of which the scant edges are pinched in the rim of a too narrow felly. In order to remedy this defect, he has devised a new arrangement of felly which permits of the adaptation of a tire provided with a shoulder-piece above the edges. This felly, A (Fig. 1 and 3), which is of steel, consists of two parts, viz., of an external rim,

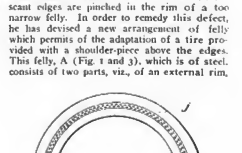


FIG. 2. THE DEVENOYE PNEUMATIC, SHOWING THE TIRE ALONE.

u, and an internal cup, *x*, to receive the air chamber, *C*. Between the latter and the felly is interposed a band of felt, *d*, which isolates it from the head of the nuts serving to fix the steel felly on the ward of the wheel.

The tire (Fig. 2) is placed perpendicular in the felly. For this purpose, it suffices to introduce the edges, *gg*, in the cavity between the external and internal parts of the felly, and to place the shoulder-piece, *hh*, in the rim

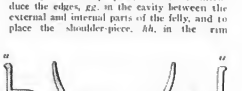


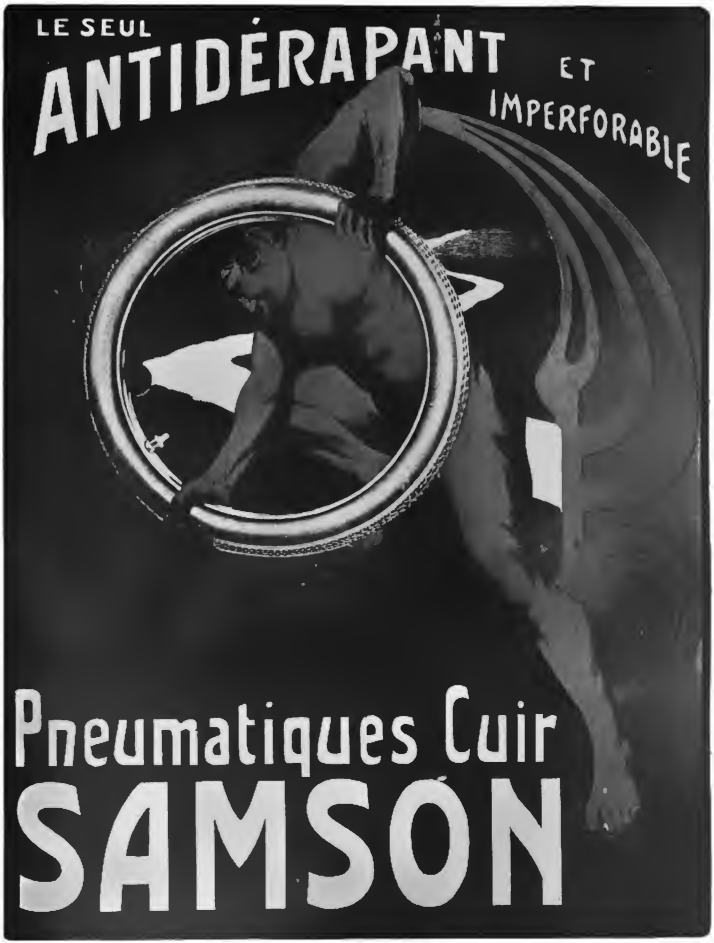
FIG. 3. THE DEVENOYE PNEUMATIC, SHOWING FELLY ALONE.

and hold it in place by plates, *E*, secured by bolts, *f* (Fig. 1). These plates, which are in the form of L-irons, are four in number on each side of the wheel, and hold the tire against the internal part of the felly.

This method of securing the tire to the felly permits of giving the inflation a maximum of pressure much greater than in the types at present in use.

This tire is, therefore, capable of withstand-

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SAMSON LEATHER TIRE A. E. GALLIEN, - - - Manager
12 WEST 33d STREET, NEW YORK

BOSTON
Samson Leather Tire
20 Park Square

SAN FRANCISCO
George P. Moore Co., Inc.
596 Golden Gate Ave.

LOS ANGELES
W. D. Newarf
932 South Main St.

CHICAGO
G. B. McKeague
1461 Michigan Ave.

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CONTINENTAL

CONTINENTAL PNEUMATICS

FIRST IN EVERY COUNTRY

At the Automobile Club of America Show, 69th Regiment Armory, New York, held January 13th to 20th, 1906, 21 makes of American and Foreign Tires were fitted to exhibition cars. They were distributed as follows:

COUNT TAKEN JANUARY 18th

1st CONTINENTAL TIRES 220

2nd	153 Tires	11th	24 Tires
3rd	102 "	12th	20 "
4th	80 "	13th	8 "
5th	68 "	14th	5 "
6th	48 "	15th	5 "
7th	45 "	16th	4 "
8th	32 "	17th	4 "
9th	30 "	18th	4 "
10th	26 "	19th	4 "
20th	4 "		
21st	4 Tires		

C. C. & G. P. CO. H.

The Continental Caoutchouc Co.
EMIL GROSSMAN, General Manager
43 Warren Street, New York
Factory: Hanover, Germany
We will exhibit at the new 71st Regiment Armory, Chicago, February 17th to 24th

Reg. U. S. Pat. Off.

ing greater internal pressures, as well as the pulling stresses in too abrupt turns.

The air-chamber is completely isolated from contact with the edges of the tire, and this does away with certain difficulties of mounting the safety bolts, and the pinching of the air-chamber under the edges.

In order to prevent bursting, the inventor strengthens his tire with wire gauze folded in several thicknesses, between which are interposed thin bands of felt impregnated with a solution of gum. The whole has a thickness of about four millimeters, and is passed through rollers and then vulcanized with the two thicknesses of rubber and canvas that form the tire.

This new arrangement as a whole, according to the inventor, permits of limiting the section of tires to 80 or 90 millimeters in the heaviest motor carriages, which now necessitate casings running up to sections of 150 millimeters. If this assertion is confirmed by practice, a great saving will certainly be effected in the cost price and the expense of upkeep, and afford a better running by reason of the smaller surface of contact with the ground.

New Process of Galvanization.

COWPER COLES, an Englishman, has invented a new process of galvanization, and has recently demonstrated the same with samples of iron, copper, aluminum and other metals. The objects to be galvanized are simply heated to 360 degrees in a bath of zinc vapor, the duration of which depends upon the desired thickness of the coating, but which is always short. After heating the objects are thoroughly coated with a layer of zinc, which on the surface has formed an alloy with the other metal by penetrating into it to a considerable depth. A copper rod can in this way be almost entirely transformed into brass, while the temperature employed remains far below the melting point of both metals. A great advantage of the process lies in the evenness of the coating, which is so perfect that such zinc galvanized screws and bolts afterwards fit perfectly into the nuts; while with other methods they have to be polished. It is also very convenient that the objects to be galvanized have no first to be cleaned.

The retorts in which the heating takes place are of iron, and are heated from the outside. Another peculiar advantage is that the zinc does not adhere to the walls of the retort, but that these, after months of use, are entirely clean. The explanation for this is that the walls of the retort are heated most, so that no zinc vapor condenses on them. Experiments to use the process with metals other than zinc have been so far made with copper and antimony, and have been partly successful, but not to a degree to make them of practical use.

SKID PROOF RUBBER TREAD



Are to the Automobile what a Rudder is to a Ship, by its perfect Traction prevents all slipping, slewing and skidding. Gives perfect control of the car on all conditions of surface, great durability and more speed. Order them on your new car. Pat'd.

Made and sold by all the best tire makers and furnished as standard equipment by all automobile manufacturers and dealers. See them at all automobile shows. New York, Boston, Chicago.

C. J. BAILEY & CO., 22 Boylston St., Boston, Mass.

TIRE REPAIRS The largest and best equipped repair shop in America.

N. Y. B'WAY RUBBER TIRE CO.
Broadway Branch, 4411 Broadway. 253 W. 47th St., N. Y.

ANTI-PUNCTURE

Is Proof Against All Punctures



Saves the Incessant Tire Expense

A Million Automobiles Daily Appreciate Anti-Puncture Tire

Will Not Rot Tires

Has Stood All Kinds of Tests and Is Fully Guaranteed

Agents Wanted Everywhere

Demonstrations that Anti-Puncture in your tire means no puncture

American Anti-Puncture Tire & Auto Co.
1693 Broadway, New York City

Tell Us Your Tire Troubles

We repair or remake old Automobile Tires. Let us repair your tires. Repairs done immediately on receipt of mail or telephone instructions. Tires remade with New Specialty.

D. E. FOOTE RUBBER COMPANY
69-73 Frankfort St., Cleveland, Ohio



The Mesinger Non-Skidding Tire Band

To be used on Wit Kaffir, Saw and Ess

Size	Price	Size	Price
28	$4.00	34	$5.00
30	4.50	36	5.50
32	4.75	38	6.00

M. & F. MESINGER MFG. CO., 1301-1307 First Ave., New York

PUNCTURES are instantly repaired by the use of Park's Auto Cement.

Absolutely guaranteed that tire will not affect this cement the hottest summer days. Sample cans, sufficient for 10 patches, post paid, 35c.

F. B. PARKS CO.
173 Prescott St., Grand Rapids, Mich.

For advertisements see Table of Contents. Rates and terms on request.

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Swinehart TIRES

Without Swinehart Tires an Automobile is an Uncertain Means of Travel

RESILIENT



RELIABLE

Will give as satisfactory results in snow as on boulevards

Not Stalled But Waiting for Photographer



Best Tire Made for Pleasure Cars as well as Commercial Vehicles

Catalog M.

The Swinehart Clincher Tire & Rubber Co.

AKRON, OHIO

NEW YORK, 1843 Broadway
BOSTON, 97 Haverhill Street
CHICAGO, 1231 Michigan Ave.
DETROIT, 239 Jefferson Ave.

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PENNSYLVANIA CLINCHER TIRES

are made for service—not for profits.



The $1,000 Tire Economy Competition concerns every owner or driver of a Motor Car; especially in the fact that he can send us his old tires and receive 20 per cent. allowance for them in buying Pennsylvania Clincher Tires.



New York: 1665 Broadway
Philadelphia: 615 N. Broad Street
Chicago: 166 Lake Street
Boston: 167 Oliver Street

PENNSYLVANIA RUBBER CO.
JEANNETTE, PA.

St. John
Non-Puncture
Auto Tire

Space J, Basement
69th Regt. Armory
Automobile Show
January 13th to 20th

THE HAPPY MEDIUM

The St. John Solid Rubber Cushioned Tire

The greatest tire man's ingenuity ever produced.
It entirely solves the most vexing problem now presented to both the manufacturer and private owner of automobiles.
It cannot PUNCTURE. Perfectly RESILIENT, and saves fully one-third the power now expended on other tires. Fits regular Single and Clincher rims. Quickly applied.
Adopt our tire and save annoyance and expense.
Write for our 1906 Catalogue with instructions, etc.

THE ST. JOHN RUBBER TIRE CO., Inc.
116 Broad Street
New York

69th Regiment Armory,
Jan. 13-20, in Basement

Auto and Cycle Tire Manufacturers

Chauffeurs can best find a position by using the

Chauffeurs' Registration Bureau

1789 Broadway

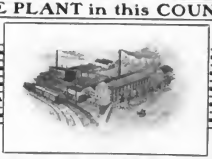
Send stamps for particulars



Fleetfoot
THE LARGEST INDEPENDENT



TIRE PLANT in this COUNTRY



"PANTHER"
Heater-Cured Wrapped Tire
"PANTHER" Covered Tubes Guaranteed not to Pinch, Blow Out, or Tear. More pure rubber, stronger and more durable than any tire made.
ALL SIZES
WE HAVE AN INTERESTING PROPOSITION TO MANUFACTURERS OF COMPLETE CARS. WRITE US



Fleetfoot
RUBBER MFG. CO.
Rutherford, N. J.



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"Firestone"

Pneumatic Tires

At the New York Show

met with a reception which amounted to a triumphant ovation.

We received for the FIRESTONE the largest order for rubber tires ever placed by an automobile manufacturer.

We shall exhibit them at the Chicago Automobile Show and if you are interested in the latest development in PNEUMATIC TIRES do not fail to visit the FIRESTONE Booth.

The body of the **Firestone Tire** is unusually sturdy in its make-up. The fabric used is the best Sea Island Cotton carefully selected for purity and strength. The rubber is the choicest Up-River Para so scientifically compounded as to give it the greatest possible wear-resisting quality.



The tire is attached so securely that it cannot possibly come off, inflated or deflated, no matter how severe the service.

The union of the tire and flange is extremely close to prevent moisture from penetrating to the inner surface to the detriment of tube and casing.

The removal and replacement of a **Firestone Pneumatic Tire** is accomplished with the utmost ease and in the shortest possible time.

Any novice can with an ordinary wrench secure access to his inner tube or remove the tire complete in less than two minutes. The tube may be replaced and the tire refastened in the same time.

There is no prying or pulling on the tire, and consequently no possibility of causing injury such as frequently occurs from the use of old fashioned tire tools.

Remember we particularly recommend **Firestone Tires** to any one who appreciates the best the market affords. We know they are supremely good and will give better and more lasting service than any tire you ever used.

Firestone Side Wire Solid Tires for commercial vehicles have been on the market for years, and have proven the excellence of our methods of construction.

To-day more than 80% of all such tires in use in this country are **Firestone Tires.**

We invite correspondence and will be pleased to furnish full information and advertising literature upon request. **Then why not Firestone?**

Branches:
New York Boston Philadelphia
Chicago Detroit St. Louis

Firestone Tire & Rubber Co., Akron, Ohio

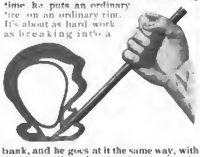
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Why Goodyear Auto Tires Won't Creep

DID you ever try to force an inch tube over an inch and a quarter bar—or to put a pair of No. 7 gloves on a No. 8 hand?

You wouldn't be so foolish, would you?

But that's to all intents and purposes what the Automobile Man has to do every time he puts an ordinary tire on an ordinary rim. It's about as hard work as breaking into a bank, and he goes at it the same way, with a "jimmy" and other burglars' tools. Because a 26-inch wheel (for example) is really *27 inches* in diameter, when you consider the flange. So a 26-inch tire has to be forced over a 27-inch rim every time you put on a tire, or take it off.



It's a heart breaking job, even for a strong man, and it takes from half an hour to an hour each time you do it.

And after you have removed such a tire a few times, the base of the tire becomes stretched, and the fabric (used to strengthen it) becomes broken in places, until this tire becomes 27 inches in diameter instead of 26, a full inch larger than the face of your wheel. So you have to bolt it down, or it will creep, tear the valve out and cause all kinds of trouble. And even then you have to keep it pumped up continually as hard as it will stand.

Now the Goodyear Detachable Auto Tire can't creep, because, in the first place, it doesn't have to be *forced* on! (If you use the Goodyear Universal Rim.) The 26-inch tire slides right on to the 26-inch rim as easily as you would put on your hat. It doesn't have to be pried over a 27-inch flange.



And next, at the first stroke of the pump, the tire begins to grip the rim like grim death, because there is a mesh or tape of piano wire vulcanized clear around the tire on each side of the base.

When the tire is flat these wires are like this:



And each single wire like this:



The instant you begin to pump, this wire begins to shorten like this:



And when the tire is pumped up hard, the wire mesh is like this:



If you put a Goodyear Auto Tire on a wood rim, and pump it up hard, the pressure will be so great that the base will squeeze a ridge in the wood.

So the Goodyear Auto Tire need be only *half* inflated, and it will still have a firmer grip on the rim than it is possible to secure with plates and bolts.

This, however, is only *just one* of the good points of this trouble-saving tire.

You will find other points in our "Good News Book." It is vitally interesting to every Motorist. Every Dealer or user, for it shows the way to perfect relief from Tire Troubles. It's FREE. Ask for it.

THE GOODYEAR TIRE & RUBBER COMPANY, Mechanic Street, Akron, Ohio.

Branches in following cities: Boston, 6 Merrimac St.; New York, 253 West 47th St.; Chicago, 110 Lake St.; Cincinnati, 242 East Fifth St.; St. Louis, 1219 N. Broadway; Cleveland, 60 Frankfort St.; Philadelphia, 1521 Sprug St.; Denver, 220 Sixteenth St., and Detroit, 212 Jefferson St.

Bailey "Wont Slip" tread furnished on Goodyear Tires (all sizes) when ordered.



TAKES BUT A MOMENT TO DETACH FISK TIRES

ITS attachment to a perfectly flat rim insures the all important Ease of Detachment,—without the aid of crowbars or pickaxes. And yet its rim-locking device makes it *the one* tire that absolutely cannot come off the rim of its own accord whether deflated or not.

FISK TIRES Add a Distinct Completeness to Automobile pleasures obtainable by the use of no other tire made. If not positively essential, they are at least a necessity to those who wish the Least Annoyance, Enduring Service, and Comfort.

The FISK RUBBER CO., Chicopee Falls, Mass.

"Where to Locate" "Hideaway in Tire Selection"

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WALLWORK'S

New Patent 1906 Diamond Pattern

NON-SKIDDING *and* RE-TREADING COVER



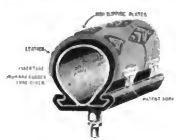
For Motor Tires

Better and cheaper than having tires recovered.

Any person can put on or take off in a few minutes.

Cannot come off on the road.

THOUSANDS IN USE IN EUROPE



TO FIT ANY SIZE TIRE OR WHEEL

Made from the Best Chrome Leather and Metal

IT IS PUNCTURE PROOF

Very little dust caused, as vacuum is formed under tread. No car should go out without several of our Patent Covers in case of accidents.

An old worn-out tire is made equal to new when our Patent Cover is put on. The resilience is not affected in any way.

THE WELLS LIGHT MFG. COMPANY

44 and 46 WASHINGTON STREET, NEW YORK

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MORGAN AND WRIGHT

MORGAN & WRIGHT TIRES ARE GOOD TIRES

Morgan & Wright Tires

stand without a peer in point of the superior excellence of each individual tire



CLINCHER



DUNLOP



BAILEY "WON'T SLIP" TREAD

We have no special tires for special occasions. Every tire is made as carefully as tho the reputation of Morgan & Wright depended upon its behavior. Every tire represents a premeditated and determinedefforton the part of Morgan & Wright to secureand hold your tire business—and we make no bones of saying so. This insistence upon individual merit has caused these tires to be the most generously advertised tires from user to user of any tires on the market. Specify them on your 1906 car.

Morgan & Wright, Chicago.

NEW YORK, 214 West 47th Street
SYRACUSE, 214 South Clinton St.
PHILADELPHIA, Broad and Vine Sts.
BOSTON, 228 Columbus Avenue.
CLEVELAND, 247 Huron Street
DAYTON, 417 East 5th Street
MINNEAPOLIS, 708 Hennepin Ave.
DETROIT, 265 Jefferson Avenue
ATLANTA, 34 Ridgewood Avenue
ST. LOUIS, 538 N. Vandeventer Ave
DENVER, 1362 Broadway
LOS ANGELES, 940 So. Main Street
SAN FRANCISCO, 1067 Mission Street
PORTLAND, 86 6th Street

Telephone 3787-Bryant — Expert Workmanship Guaranteed

J. A. HARRISON

Rubber Tire Vulcanizer



1555 BROADWAY — NEW YORK CITY
Between 46th and 47th Streets

All Makes of Domestic and Foreign Tires Repaired Promptly

SANS' Vulcanizer

Don't send your tires to the repair man

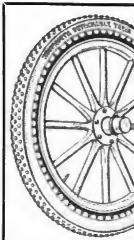
PUNCTURED SPLIT or TORN — No matter how bad they are; DO IT YOURSELF. It takes 10 minutes—costs a few cents and NO BILL TO PAY

If you send it to the shop they will use anyhow Vulcanizer — SANS'

SOLE U. S. AGENT

International Motor Car Supply Co.

TELEPHONE, 1157-38th — 41 W. 33d St., N. Y. City



THE

1906 Woodworth Detachable Tread

Is perfect in every particular. It can be applied in 15 minutes, and requires no tools but a pump. Simply deflate the tire, slip the cover over it, tighten the wire side-ropes, blow up the tire, and it is ready for use.

Our new semi-flat tread greatly increases the wearing surface, and makes the tread maintain its position perfectly straight on the tire. Suitable for any make of pneumatic tire, old or new. Prevents punctures, skidding and all wear of the tire surface. Costs less than a vulcanized tread, and is much better for it does not weaken the fabric. Write for circular and prices.

Leather Tire Goods Co.
MAKERS.
Newton Upper Falls - Mass.

THE NEWMASTIC FILLING

MAKES PUNCTURES IMPOSSIBLE

ADAPTED TO CLINCHER and SINGLE TUBE TIRES

Prolongs the life of the tire, making it practically indestructible, and

AS SAFE AS A SOLID TIRE

Does not affect resiliency. — Write for particulars

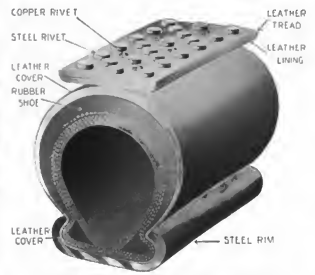
NEWMASTIC TIRE CO. - - St. Louis, Mo.
CHICAGO, ILL., and LOS ANGELES, CAL.

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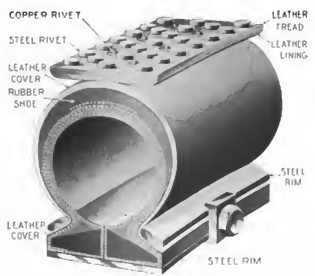
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THE HEALY LEATHER COVERED TIRE

GUARANTEED



SECTION OF CLINCHER TIRE LEATHERIZED



SECTION OF FISK TIRE LEATHERIZED

Manufactured by skilled labor under expert supervision from carefully selected leather

ONLY THE FINEST STOCK IS USED AND THE TIRE IS MOULDED BY A SPECIAL PROCESS

UNLIKE OTHER AMERICAN OR FOREIGN TIRES IT DOES NOT HEAT THE RUBBER

The covering of this one clinches underneath the rim, making it impossible for the leather to warp or peel off

THE HEALY

is positively the best leather covered tire made at any price, either in this country or abroad

We also cover old tires with anti-skid or plain treads, making them equal to new

Price List and Descriptive Circular sent upon application

MANUFACTURED BY

J. M. DELANEY & CO.

304 Hudson Street

NEW YORK

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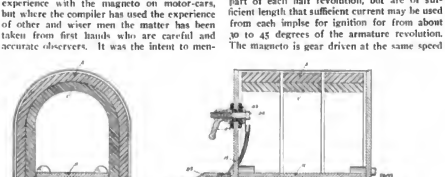
The Magneto.

BY ALEX SCHWALBACH.

(Continued from January.)

THE story of the "Magneto" has taken more space than was originally contemplated by the compiler, and while the magneto has not in the past been as largely used in this country as it should have been, and hence not so largely written on here by experts as abroad, the details already recorded in these articles are as complete as careful and accurate observation can make them. The conclusions and comments in the preceding articles were the direct results of the compiler's own personal experience with the magneto on motor-cars, but where the compiler has used the experience of other and wiser men the matter has been taken from first hands who are careful and accurate observers. It was the intent to mention from the magneto through each of the insulated electrodes of the motor and through a switch if desired. Motors are started directly from the magneto upon turning the motor over in the usual way. The spark is timed by timing the electrodes, the magneto and its gearing remaining the same—it differing in this respect from the high-tension magneto.

The magneto generates two electrical impulses for each revolution of its armature at diametrically opposite points in the armature revolution. These impulses last for only a part of each half revolution, but are of sufficient length that sufficient current may be used from each impluse for ignition for from about 30 to 45 degrees of the armature revolution. The magneto is gear driven at the same speed



REMY LOW TENSION MAGNETO, TYPE R, TRANSVERSE AND LONGITUDINAL SECTIONS

tion these authorities in a table at the close of the article, as is usual in articles of this character, but for fear that some may not see this reference, and to those who care to go any deeper in the subject, the detailed construction of the motor-car now being, like all other matters, a subject of specialization, readers are referred to the following authorities already used: T. H. Hawley's book on "Motor Ignition Appliances," cost 2 shillings to pence, post free, published by the Cycle Trade Publishing Co., London; J. La Coste & Co., of Paris; Ernst Eisemann & Co., Stuttgart, Germany, and the Remy Electric Co., of Anderson, Ind., whose magnetos are the subject of the present article.

Remy magnetos are not radically different in mechanical principle to foreign-made magnetos now so largely used abroad, but it must be said that they are radically different in principle of construction from other American-made apparatus used for this purpose, and hence are very interesting. It is claimed that the Remy magnetos are used more largely in connection with American-made motor-cars than all other mechanical ignition generators. Among the prominent makers who use the Remy magnetos on their new models are the Electric Vehicle Co., Knox Automobile Co., F. B. Stearns Company, Matheson Motor-Car Co., Apperson Bros., and a number of less prominent makers.

The low-tension, alternating-current Remy magneto system of ignition possesses some very great advantages. From an electrical standpoint, it is one of the most simple in use, since it requires no spark coil or battery, whether used with motors of single or multi-cylinder type. The complete wiring required, as will be seen by the wiring diagram, is one wire lead-

or an even multiple of the motor speed and the gears are so set in installing the magneto that the timing range of the motor electrodes coincides with the range of the electrical impulses of the magneto. The range of the electrical impulses is marked upon the magneto to make the setting of the gears possible. The magneto being gear driven at the same speed or a multiple of the same speed of the motor, must therefore keep step with it and the impulses generated by it coincide with the separation of the motor electrodes. Since at the times between the impulses in the revolution of the magneto armature there is no current generated, it is evident that should the gears be improperly set so that the impulses and separation of motor electrodes did not coincide, a spark would not occur. The alternating-current magneto must therefore always be gear or positively driven and properly timed.

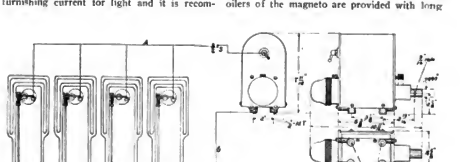
It cannot be used for charging batteries nor furnishing current for light and it is recommended only for the purpose for which it is made—ignition.

If batteries of any kind be improperly connected with magneto, or the magneto is run on a short circuit, there is a decided tendency to demagnetize its magnets, for the reason that a powerful electro-maguet is made of the armature of the magneto which acts in direct opposition to the permanent magnets, weakening them.

CONSTRUCTION.

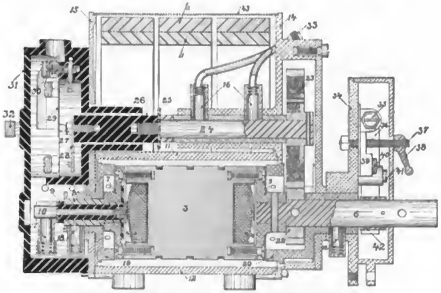
Referring to the sectional cuts, the permanent magnets No. 1 and No. 2 are made from the best magnet steel known and for the particular purpose for which it is used. No. 3 represents the soft grey iron armature core. It is wound with No. 24 double silk covered magnet wire (No. 4) carefully insulated with both fiber and mica, then taped, varnished and baked. No. 5 and No. 7 represent hard brass armature ends. They are held by long steel screws sweated to prevent loosening. The armature shafts No. 6 and No. 8 are screwed into the armature ends against a shoulder, then riveted. They are also pinned and the pin riveted, making it absolutely impossible for the shaft to loosen. The armature is of very heavy construction in these parts—much heavier than in similar magnetos of foreign make. The insulating bushing No. 9 is of hard rubber and its washer inside of armature end of micabeston insulating material. No. 10 is a hardened steel conducting pin which carries the current from the armature of magneto. No. 11 is the top yoke of magneto frame and is of aluminum. No. 12 is the bottom yoke or base of magneto and is also made of aluminum. Nos. 13 are soft grey iron pole pieces. No. 14 and No. 15 are the main ends of the magneto frame. They are aluminum bushed with bronze bearing metal. Nos. 16 are unusually large felt wick oilers. No. 17 is hard rubber brush-holder support. No. 18 is brass brush holder. No. 19 is a hardened steel brush made with a pin through it to prevent its turning. No. 20 is conducting cable. No. 21 is cable screw. No. 22 is terminal binding screw complete. No. 23 is hard rubber insulation. No. 24 is binding screw nut. No. 25 is an aluminum cap which prevents dirt and water from getting inside of the magneto. No. 26 is aluminum sheet metal cover to the magneto.

The magneto without gears weighs twenty-four pounds and measures over all 4¾x10 11-16x7 11-16 inches. The lubrication of the magneto is the only attention that need be given it. It should be oiled once in about every 500 miles made by the car, but it is not so important that it be oiled after a definite length of time as it is that it be carefully oiled. The oilers of the magneto are provided with long



REMY LOW TENSION MAGNETO, TYPE R., WIRING DIAGRAM

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LONGITUDINAL SECTION, REMY HIGH TENSION MAGNETO

1—Inside magnet.
2—Outside magnet.
3—Armature core.
4—Armature winding, wound in a double insulation of mica and fiber. Winding is taped, varnished, bound with steel binding wires and baked.
5-7—Hard brass armature ends.
6-8—Armature shaft.
9—Hard rubber and mica bestos insulation.
10—Hardened steel conducting pin.
11—Top yoke of Magneto frame (aluminum).
12—Bottom yoke of Magneto frame or base (aluminum).
16-18—Felt wick oiler.
17—Conducting bearing.
19-20—Hard brass ends of shifting pole pieces.
21—Shifting pole pieces.
22—Small brass gear.
23—Fiber gear.
27—Hardened steel screws.
29—Steel distributor spring with hardened steel point.
31—Molded hard rubber distributor.
35—Contact screw.
36—Circuit breaking lever (aluminum).
39—Insulated block.
40—Primary terminal screw.
42—Cam.

Nos. 19, 20, 21 and 34 are locked together. A timing angle of 110 degrees is possible

felt wicks, which, if thoroughly saturated with oil, will last the bearings for a long time. At the same time, with this oiler, it is impossible to flood the magneto with oil. The two oilers are the only places to be oiled. The magneto can have water dashed over it without danger of injury, though it is advisable to protect it in this respect about the same as the wiring.

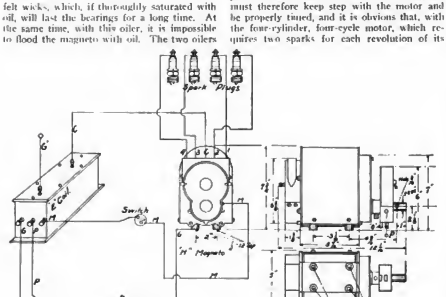
WHAT TO DO IN CASE OF TROUBLE.

Remove the aluminum cap over conducting bearing and clean the brush holder and all parts thoroughly with gasoline, removing the hard rubber brush holder support, if necessary. The magneto can be taken apart and assembled without difficulty, but this should not be done unless absolutely necessary, for the reason that when the magneto armature is removed, the magnets lose more or less of their strength. Always return the magneto to the factory to be repaired, if possible, before taking apart.

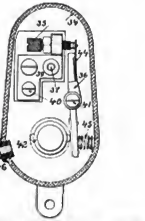
Remy High Tension Magneto, Type H

The high-tension Remy magneto, type H, unless special, is for use with the four-cylinder motor. It is a gear-driven, alternating-current generator, which starts and runs the motor without the aid of batteries. The distributor and spark-timing device are a part of the magneto. In other words, with the single coil used with it, it forms the complete ignition outfit.

The magneto generates a strong electric current at a low voltage, but a very high amperage, and delivers it to the coil or transformer which then delivers a high-voltage current through the distributor to the motor. The magneto generates two electrical impulses for each revolution of its armature, the impulses occurring at diametrically opposite points in the armature revolution and lasting only a short part of each half revolution. The magneto must therefore keep step with the motor and be properly timed, and it is obvious that, with the four-cylinder, four-cycle motor, which requires two sparks for each revolution of its



WIRING DIAGRAM



TRANSVERSE SECTION OF CAM HOUSE

crank shaft, the magneto should be driven at the same speed as the crank shaft. Referring to the sectional cuts ignition occurs every time circuit is broken by cam (No. 42) between platinum pointed screw (No. 35) and spring (No. 44). The driving gear of the magneto, which is mounted upon shaft (No. 6), must therefore be set with relation to the motor so that the spark will occur at the time desired. The spark is advanced or retarded by rocking the circuit breaker around the armature shaft by means attached at the lower part of box (No. 34). The shifting pole pieces (No. 21), the armature ends (No. 19) and the circuit-breaker box (No. 34) are locked together, so that the time the circuit is broken is not only changed with relation to the motor in timing the spark, but the time the maximum current is generated is changed as well. A timing angle of over 100 degrees is possible.

The armature winding consists of a single coil, one end of which is grounded and the other connected to the conducting pin (No. 10), which carries the current to the conducting bearing (No. 17), from which it is delivered to the wire leading to coil.

The coil is considerably larger than the regular single jump spark coil and its winding and insulation especially designed for the magneto current. This coil does not have a vibrator nor adjustments of any kind and is usually placed under the seat of the car. Since it is especially designed for magneto current, it destroys batteries in a short time when used with them, although a very hot spark can be secured while they last.

The distributor is a simple arrangement for distributing the current to the different cylinders of engine. The revolving part of distributor is back geared, so that it runs at one-half the speed of the magneto armature.

The magneto high-tension spark, at a speed of 25 to 50 turns per minute, is about ½ inch in length in air, at 300 or 400 turns per minute about 1¼ inches, and from 1¾ to 2 inches in length at higher speeds. The spark is very

(Continued on page 92.)

Directions for Wiring

Connect wire G to magneto base or to motor frame if magneto makes good metallic connection with it.

Connect G' to motor frame.

Wires C, 1, 2, 3 and 4 must be insulated with rubber having a diameter of ½ inch.

Other cables must be No. 14 B & S gauge, or larger.

For jump spark only.

Gear driven at same speed as crank shaft.

For four-cylinders 4-cycle H has double cam.

Magneto must not be short circuited or batteries connected with it, except according to the maker's wiring plans, or magnets will be demagnetized.

Gears must be set so when motor cranks are horizontal, segment (No. 28) will be leaving point connected to working cylinder.

Direction of rotation of magneto may be changed by turning rotating distributor segment over. Wiring blue prints are always sent with magnetos.

Connect timing rod at point O.

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hot and motors are started easily from the magneto when turned in the usual way. On account of the very high voltage of the current it is important that a very high grade of high-tension cable be used for wiring and it should have an insulation of rubber not less than ½ inch in thickness.

CARE OF MAGNETO.

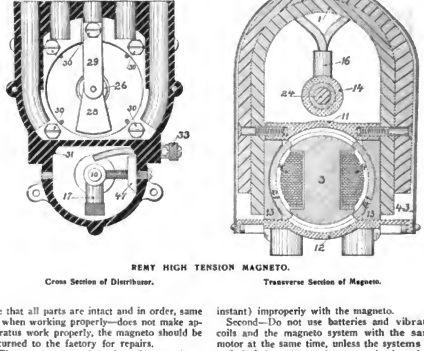
The lubrication of the magneto must be given careful attention and each of the five oilers carefully oiled once in 500 miles made by car, also a drop of oil given to the circuit-breaking lever bearing and the cam. The oilers are each provided with long felt wicks, which will not permit the magneto to become easily flooded with oil, and when saturated with oil, will last the bearings a long time without attention.

The platinum contacts should be examined occasionally to see that they are clean, and they must not be allowed to become oily or dirty. If they are worn, clean carefully with emery cloth. Do not adjust the platinum point screw unless absolutely necessary and then one-half turn to the right.

WHAT TO DO IN CASE OF TROUBLE.

Look first to the ignition plugs and high-tension wiring. If one cylinder misses and the others fire properly, it is safe to say the trouble is not in the magneto. A spark plug which is in working condition for batteries, may not be for the magneto, on account of the difference in the strength of the current. If none of the cylinders fire regularly, clean the platinum points carefully with emery cloth and, if necessary, screw the platinum pointed screw in one-half turn.

Remove the distributor cover and clean all parts carefuly with gasoline. (Be careful to let the gasoline evaporate from these parts before starting motor, or it may ignite.) If the trouble has not yet been located and a close inspection of exposed parts of magneto—to see that all parts are intact and in order, same as when working properly—does not make apparatus work properly, the magneto should be returned to the factory for repairs.



REMY HIGH TENSION MAGNETO.

Cross Section of Distributor. Transverse Section of Magneto.

The magneto can be taken down and assembled without difficulty, but it is not advisable to do this outside the factory, unless absolutely necessary, and then only for temporary relief.

THINGS THAT SHOULD NOT BE DONE WITH THE MAGNETO.

First—Do not connect batteries (even for an instant) improperly with the magneto.

Second—Do not use batteries and vibrator coils and the magneto system with the same motor at the same time, unless the systems be entirely independent and not even having their high-tension wires connected to the same spark plugs.

Third—Do not remove magnets nor armature from magneto.

To violate one of the above rules may cause the magneto to cease working altogether and will at least have a tendency to weaken it.

IGNITION AT THE SHOWS.

A DISPOSITION to use make-and-break ignition more generally was very pronounced at the shows, and some of the new make-and-break devices have much to commend them. The one objection to make-and-break ignition—the moving part through the cylinder wall—in most cases is now so designed as to insure an entire absence of trouble under ordinary working conditions, while its various advantages—such as absence of short-circuiting, etc.—are retained in the fullest possible measure.

The use of the magneto as a source of current, both for high-tension and low-tension systems, is on the increase, and it would seem only a question of time before all forms of batteries on big cars will be obsolete for this purpose, though there still must be a year or so of development before this will be the case. Great as are the advantages of batteries, the advantage of a perfectly self-contained power plant, including within itself an unfailing source of ignition current, are greater, and, with any sort of progress in the future, will prevail. Many magneto-equipped cars are so arranged that cranking the motor generates ample current for starting, thus doing away with the starting battery. For cars in which self-starting is made a point—the production of a spark in the mixture retained in one or more cylinders being the means—the batery is, of course, essential. Whether this sort of construction will keep the battery in use, or whether the era of self-starting devices will make batteries unnecessary, are questions that an inspection of the cars at the shows suggested rather than settled.

In a general way, there is little that is new in ignition systems. Simplicity, reliability, and low cost have been sought instead of innovations and complications. Ideas not new, but that are carried out this year better than ever before, are enclosed magnetos, protected from dirt and injury; unit spark coils, with sectional windings that permit ready replacement of a short-circuited part, without interference with the rest; wiring systems that permit easy disconnection of all portions of the circuits; commutators and distributors with larger bearing surfaces, both wearing and contact; iridium or platinum-iridium contacts (because of their wear and corrosion-resisting qualities) for make-and-break and trembler terminals; and devices that interconnect the ignition control with the decluteling elements, so as to prevent motor racing.

The best spark plugs still use lava, porcelain, or mica insulation, but there is an increase in the depth of the air spaces provided around the sparking points. Arrangements for advancing and retarding the ignition in make-and-break systems are surprisingly ingenious and reliable. The hammer blow, in some form or another, is generally depended upon to insure a sharp separation of the terminals at all speeds, while different shifting-cam devices control the advance. In many of the best cars, these shifting cams are enclosed in the crank case, or within a special housing, so that they run in oil and are subjected to very little wear.

NEW PITTSFIELD COIL.

THE Pittsfield Spark Coil Co., of Pittsfield, Mass., has brought out a new coil, original in almost every detail from the vibrator to the high-tension terminal. Those who have tested it are surprised at the efficiency, rapidity, and broad range of adjustment. The company has already entered large orders for these coils from several of the leading motor-car manufacturers, and is now enlarging its quarters and equipment to enable them to double their former production.

In designing the new vibrator the aim has been to overcome all of the objectionable features which have manifested themselves in vibrators heretofore. These objectionable features are enumerated as follows:

1. The vibrator is what is termed a semi-hammer blow. The main spring and armature being so constructed that freezing or sticking is rendered impossible, due to the fact that the armature is independent of the main spring at the projecting or contact end; hence, at time of break the armature is allowed to swing a little beyond or higher than the contact carrier or spring end, and when contact is again made the armature descends with considerable force and breaks the connection between the platinum points, thus making it impossible to stick or freeze.

2. The long range of adjustment in this vibrator is due to the arrangement of the auxiliary or tension spring, and the tension adjusting screw in the block. The spring tilts on a small rod. This spring is so proportioned in relation to the number of threads per inch on the screw that it can only be adjusted to consume a maximum of current, at which the coil will do its best work on the motor.

3. In the adjusting screw locking arrangement, ample provision has been made to take up wear, and at the same time to furnish sufficient friction for the screw to insure the maintenance of the adjustment after this has been accomplished in every-day use, and under all conditions that it would be subjected to on a motor-car.

4. The extremely short space of spring between the block and the armature, and the double action of the spring and armature combined, solves the problem of why this vibrator is quick and impulsive. This is necessary in a vibrator, especially when employed on a motor-car.

5. The wasting of platinum in vibrators is due to the position it occupies on the armature. It will be noticed in this vibrator that

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the platinum contact point is mounted on the spring and projects through the armature; hence, uses the spring as a cushion. This eliminates the severe mechanical action which takes place in vibrators. We may say also that the double movement of the spring and armature has a tendeney to eliminate the electrolytic effect of the current upon the platinum; hence, it will be seen that this vibrator will cause very little wear on the platinum points.

6. The current economy of this vibrator is due to the cushioned spring, also to the speed and impolsivesness of the armature; in other words, it does not rest on the contact. It is also due to the fact that the vibrator, as a whole, is so constructed that it cannot be adjusted to consume more than the maximum of current required to do the best work, and give the best results on the motor.

7. In view of the fact that all of the foregoing improvements have been accomplished, it can be seen that synchronism between a multiple of coils provided with this vibrator and the same number of cylinders on the motor can be established and accomplished even by a novice.

The above, taken in connection with the perfect insulation of the Pittsfield coil, makes it most reliable, durable, and satisfactory in every way. The insulation is so perfect that it cannot be ruptured or punctured, and its neat appearance, it being the smallest American coil made, promises to make it one of the most popular pieces of ignition devices yet manufactured.

A SPARK PLUG WITH NOVEL FEATURES.

SOME novel and attractive features are shown by the Never-Miss Spark Plug Co., of Lansing, Mich., in their new type of ignition plugs. There are a number of new features to be found in their plug, chief among them the electrode. This electrode is made with a cup-shaped cap at the end, into which is wedged a platinum alloy point; the porcelain being tapered, slips down over the rod into the cup-shaped receptacle at the end of the electrode. The only packing used is in the cup-shaped cup, which is a vulcabestos washer. The porcelain slips on the electrode, the tapered point of which fits snugly into the cup, 1/64 inch space being allowed for the expansion of the electrode. It is conceded by electricians that porcelains do not expand, but the expansion is in the electrode which causes the breaking of the porcelains, and wherever this defect is not taken care of there is more or less trouble in this direction.

The steel spring washer which slips over the threaded part of the center electrode, rests on top shoulder of porcelain and forms a protection from the jar of the plug while in the cylinder. The brass cap screws down on a spring washer, to draw the electrode tightly together, and holds the porcelain rigid. Even though an accident should occur, the peculiar construction of this plug would enable one to get where he could secure repairs, even if the porcelain was broken.

A copper gasket, vulcabestos lined, is used on the inside of the shell, and the center shoulder of porcelain rests on this, which is the only gasket used in the construction of the plug.

A great amount of air space is allowed for in this spark plug, making it absolutely self-cleaning, from the fact the intense heat of the cylinder would consume 05 per cent. of the refuse that would accumulate from lubricating oil or any rich mixtures.

A point to point contact is used in this plug, as will be seen from the illustration showing the sectional view of the plug.

The feature of the point to point contact is that it gets the spark lower into the cylinder than with other types of contact, viz.: side to point, and it is simply impossible for the plug to get corroded or to soot over, while with the other side to point contact the space where the spark should take place gets sooted over easily and thereby causes the plug to short circuit. Imported porcelains are used entirely in the construction of the spark plug, genuine platinum alloy points of contacts being used. The manufacturers state that 10 per cent. less coil energy is required to get the proper spark with this plug than those of different construction.

There are also several improvements made by this company in their box and dash coils. An entirely new departure in the way of a vibrator has been added, which works very satisfactorily on either high or low speed. On low speed running from 650 to 900 revolutions less batteries are required, and but one more battery is needed to run 1,500 to 2,000 r.p.m. They claim for this vibrator that it is absolutely fool proof, as there is no complicated adjustment of platinum points. This style of vibrator is used on all box coils for marine and stationary work. Users of marine motors will immediately see the value of this vibrator.

They also manufacture a battery connection with a corrugated terminal. The corrugation forms a perfect spring which holds the connection in place, so that the vibration of the motor or car does not loosen it, thereby giving a perfect contact.

THE PERFECT TIMER.

IS one of the most simple, durable and efficient timers ever offered to motor-car users. It consists of very few parts, all of which are substantially made of the finest materials. There are no intricate or delicate parts to get out of order. Accessibility is a strong feature —it can be taken apart almost instantly.

Special attention is drawn to the method by which the contact is made. Attached to the main shaft is a phosphor bronze spindle fitted with a hardened, tool-steel pawl, which is made flexible by a heavy coil spring. As the shaft revolves, it makes a short, but positive, wipe against the contact bushings, thus giving the maximum of contact with minimum battery consumption. By the simple method of reversing the pawl the time shaft can be run in either direction, necessitating no change to the timer whatever after it leaves the maker, other than reversing the pawl, which is done by taking out the pawl pin and placing spring in the opposite hole. The bushings are of a roller shape, but stationary and so attached that by loosening the bushing stud, the bushing can be turned to allow for any unusual wear, giving absolutely four new points of contact. This insures the life of the timer for an indefinite period. In fact, the "Perfect" Timer will outwear the best motor car, and is made for one, two, three or four-cylinder motors, by E. S. Yause, Reading, Pa.

A is the main body or case which is made of aluminum. B is the pawl or insulating core turned from hard fibre. C is the phosphor bronze spindle and the pawl or contact carrier. D, hardened tool steel pawl or contact maker. This part is made of heavy spring cut pawl, retaining pin E and turning pawl D in order to give the proper contact on contact bushings. M. G is the oil wick retaining cap. Under this cap is a hollow screw, $\frac{3}{4}$ in. depth into the spindle C with an opening on the end of $\frac{3}{4}$ in. In this space oiling wick H is retained and projects through a hole in spindle C. This gives constant lubrication to pawl D and bushings M. I is a steel bushing or sleeve not shown on the cut. In this bushing there is a hole drilled which receives the other end of oiling wick H, giving constant lubrication to bushing I. The spindle retaining collar. K are the contact indicating lines showing when pawl D starts to make contact with bushings M, and also when it leaves contact. M is the adjustable hardened tool steel bushing and in the event of it becoming worn, can very easily be adjusted so as to have an entire new contact. This bushing is held firmly in place by the contact bushing stud N, and lock nut and washer O, and then turn the bushing with a screw driver, the bushing being slotted for this purpose. P are the locking sleeves for the wire terminals, which are held firmly in place by locking sleeve springs Q. R are the locking sleeve cotter pins. S is the spring retaining cover locking device, making it easy to open up Timer for inspection.

"BREECH BLOCK" PLUG.

A NEW spark plug with unusual features has been placed on the market recently by Earl Canedy, Chicago. It has been christened the "Breech Block" plug because of the rapid opening feature, implied by the name. The thing about the plug which instantly strikes the observer upon seeing a set of them for the first time in place in a motor is the polished handle projecting from each of them. If they are placed close to an intake manifold, or other projecting part where a complete turn of the handle is obviously impossible, it is a natural thing for one to wonder how the thing is screwed in and out. An examination shows how this is done, it being plain that the porcelain holder, with its tube intact, can be removed or replaced anywhere where there is room to give the handle one-sixth of a turn. The breech is fitted with a triple thread "broken" at three points, which permits the choice of three separate handle positions in placing the plug, and the threads "catch" in either position.

APPLE AUTOMATIC STORAGE BATTERY CHARGER.

THE illustration shows the new Apple automatic storage battery charger.

This charger is a dynamo of the well-known Apple type, completely enclosed, making it water, dirt, dust and oil proof. In size it is a trifle larger than the old style Apple ignition dynamo, and gives a considerably greater output of current than the old machine.

The Apple automatic storage battery charger will give a 3 ampere charging rate on an 8-volt battery at 1,400 r.p.m., a 3-ampere charging rate on a 6-volt battery at 1,200 r.p.m., and the same rate on a 4-volt battery at 1,000 r.p.m.

The charger is fitted with a 4-inch Apple bevel friction governor, or the machine can be driven by belt, chain, or gear, if so desired.

The armature is wound with best insulated wire, additional insulation being found in by the vacuum impregnating system. The disks of the electrical iron are japanned and then squeezed together to form the armature core under tremendous hydraulic pressure. The armature core is fitted on a brass sleeve, which in turn is fastened by a key to the tool sheet shaft.

The fields are electro magnets excited by current generated by the machine itself. There is, therefore, no possibility of their losing their magnetism as so often happens with the so-called permanent magnets of high or low tension magnetos.

The commutator is built up of segments of the best drawn copper with amber mica as insulation. There are no threaded parts to the commutator to loosen as the segments and insulation are forced together in assembling under great hydraulic pressure.

The Apple automatic storage battery charger is furnished with two types of bearings, one the plain bearing type with removable phosphor bronze bearings, lubrication being provided by a felt wick oil cup which feeds the oil by capillary atraction; the other, the ball-bearing type fitted with Hess-Bright ball bearings, carrying the well-known Hess-Bright guarantee.

Among the elaims made by The Dayton Electrical Manufacturing Company who make Apple ignition apparatus are these: That the new machine will give a maximum output at a minimum speed, and that there will be no drop in voltage from no load to full rated capacity.

The Apple automatic storage battery charger should prove a boon to the automobilist or launch owner who wishes to have a perfect charging plant for his storage batteries as practically an integral part of his engine.



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HEINZE MOTOR CAR COILS





Specify Heinze Coils on your car

Heinze coils will make your engine run faster.
Consume less battery current.
Each coil section can be removed without disconnecting low and high potential wires.
Trembler has a wide range of adjustment and is positive in its action.
Coils are guaranteed against a burn-out or break-down even when using many more batteries than are commonly used.

BECAUSE

Electrical and mechanical workmanship and finish are of the very best that experienced men and machinery can accomplish.
Our years of experience in the manufacture of coils enable us to make this very superior automobile spark coil and we guarantee it in every respect.
We make everything in the coil line from 1 to 6-cylinder coils, single coils with high potential distributor for two or four cylinders, dash board coils, plain vibrating box coils and make-and-break coils.

You will make a wise move in specifying Heinze Coils and you will never be disappointed

Send for Catalogue

HEINZE ELECTRIC COMPANY

Lowell, Mass



NIEUPORT

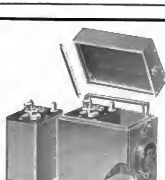
the plug that SPARKS LONGEST, and requires LEAST ATTENTION

PRICE, $1.50

Ask your dealer or write us.

Albert Champion Company
541 Tremont Street,
Boston, Mass.

Importers of Spark Plugs, Coils, Ignition Wires, Batteries, Etc.



1906 MODEL, No. 84.

WE ARE

Headquarters for Coils
Cylindrical or Encased
of all sizes and for all purposes

SPARK PLUGS, AMMETERS, VOLTMETERS

GOODS RIGHT. PRICES RIGHT
Send for Catalog.

DOW PORTABLE ELECTRIC CO.
Washington St., Braintree, Mass.

L. H. & B. O. Bill, 205 McAllister St., San Francisco, Cal.
Fogarty Bros., 118 St. James St., Montreal, Canada.
Member of the N. A. A. M.

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12,000 Miles
WITHOUT AN
Adjustment

is but one of the many
Records held by the

CONNECTICUT SPARK COILS

Think of it! This is equivalent to four years' service of the average car.

Connecticut Coils have been placed on a great many cars, resulting in *phenomenal results.* In some cases the power has been increased fully 25 per cent., and batteries last from *four* to *twenty* times as long as with other Coils.

We have the documents to prove our statements. Specify "Connecticut Coil" on your 1906 purchase. Send for Catalog No. 12M.

The Conn. Tel. & Electric Co., Inc.
100 BRITANNIA ST., MERIDEN, CONN.
The National Sales Corp., Sales Managers
256 BROADWAY, NEW YORK

QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE. ALL AGREEMENTS CONTINGENT UPON STRIKES, ACCIDENTS, AND OTHER CONDITIONS BEYOND OUR CONTROL. CHANGES MADE FOR DIES AND TOOLS DO NOT CARRY THE RIGHT TO REMOVE THEM FROM OUR FACTORY.



The Billings & Spencer Co.
Machinists' Tools
Drop Forgings

Hartford, Conn. Dec. 18, 1905.

THE CONNECTICUT TELEPHONE & ELECTRIC CO., INC.,
Meriden, Conn.

Gentlemen:-

- SPARK COIL -

Regarding the last Spark Coil of your manufacture, which we placed on our car in July, would say that this has given better satisfaction than anything we have previously used, and we are of the opinion that you have finally struck it right.

With this coil we ran over three thousand miles without touching the adjustments, using a single coil for sparking four cylinders, which is equivalent to over twelve thousand miles with the ordinary four-cylinder coil.

Not the least satisfactory results have been that we have used ordinary dry batteries for this work, and so far as tests show, the first nine hundred miles showed very little depreciation in the strength of the batteries.

The showing on the car has been most satisfactory to us and far superior to anything we have previously used. We do not care to state the names of the coils that we have previously used, but would say that we have used one and four cylinder coils of both French and American make.

Yours truly,
THE BILLINGS & SPENCER COMPANY.
F. C. Billings, V.P. & Supt.

SPLITDORF

"NOTHING TO IT"
BUT
SPLITDORF

At both the NEW YORK SHOWS
in the IGNITION line



We demonstrated again most emphatically that "QUALITY" counts.

Look for our exhibits at Chicago, Detroit and Cleveland.

Our line of Coils, Ball Bearing Commutators, High and Low Tension Magnetos, Spark Plugs, Ignition Cable, etc., is a revelation to those who have not kept in close touch with our product constantly.

C. F. Splitdorf, 17-27 Vandewater St., New York, N.Y.

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Our 1905 Automatic Switch for Battery Charging



This has many improvements—free, unopposed; wiring is accessible by taking cover, window over contacts. Cover removable by removing two screws, exposing all wiring. *Same Price as Heretofore.*

THE MARINE LAUNCH IGNITERS & LIGHTING CO., Waltham, N. Y.

SPARK PLUG FALLACIES

Any Good Spark Plug will do

DANGEROUS ERROR!



Over three years ago we brought out the famous NEVER-MISS just because other Good Plugs did not maintain that high standard of efficiency demanded by the exacting motorists which is so essential to auto and motor cycling satisfaction. NEVER-MISS won its way into popular favor at once. 100,000 sold in 1905. Our 1906 is by far the best plug on the market to-day. We can prove it. Our Coils, Battery Connectors, Chain Tools, Volt Ammeters and Terminals all merit their name and favor. Our 1906 Catalogue for the asking.

MICA, LAVA and Porcelain Plugs, any size, $1.50
Get a Set To-day

NEVER-MISS SPARK PLUG CO.
LANSING, MICHIGAN



ROBERT VOLT AMMETER
For Testing Batteries
GUARANTEED

List price $6.00 incl. leather case | 0-Volt 20 ampere | 0-.. 30 .. | 0-.. 30 .. | Send for Catalog.

The Robert Instrument Co.
65 Shelby Street *Detroit, Mich.*



INDUCTION SPARK COILS, BATTERY SWITCHES, TIMER AND IGNITION DYNAMOS

Write for descriptive matter and prices of our 1906 supplies

SCHUG ELECTRIC MFG. CO.
64 Champlain St., Detroit, Mich.

STA-RITE
"IT'S RIGHT IF IT'S A STA-RITE"

SURETY

Messrs. Clemens & Merz were sure of the four No. 4 Sta-Rite" Plugs which fired 850,000 charges in 24 hours—distance 1004 miles. You can always be just as sure of any of the 47 sizes of improved "Sta-Rites" (six types). Insist upon having "Sta-Rites" in your new car and save bother.



Garden Show Space No. 78.
Armory Show Space No. 61.
Coliseum Show Space No. 178.

The R. E. HARDY CO.
225 West Broadway, New York City

No. 84, $6 to $1.75

GEECEE BATTERY.

THIS battery contains an electrolyte which consists of a white, spongy (not gelatinous) mass made by a special process, which enables it to indefinitely retain moisture. The electrolyte not only possesses the advantage of being non-spilling, but it also acts as a separator, keeping the plates from coming in contact with each other, and thus obviating the danger of short-circuiting. The chance of a plate becoming buckled or bent is also reduced to a minimum. To prevent the electrolyte from shaking loose from the top of the plates, a layer of white wax is applied.

The plates are made of a new alloy which gives them rigidity and strength. They guarantee the positive plates for two years and the negative plates for from 3 to 4 years. The containers are made of fibre which is strong and unbreakable, yet light. Each battery has a fine leather carrying strap which renders it convenient to handle, as well as giving it a neat appearance. Trimmings, screws, binding posts, etc., are made of brass, nickel plated. The batteries are carefully assembled by skilled men, and the manufacturers, The Royal Battery Company, 143 Chambers Street, New York, have no hesitancy in guaranteeing them for two years if used according to directions. They are shipped fully charged and will hold their charge for a long period when not in use.

The company also puts now on the market a very handy charging outfit which is called the "Geecee" Charging Outfit. It is specially designed to be used in connection with the "Geecee" battery, and even a layman finds it like play to charge his own batteries, providing he has direct current on his premises. An entirely new feature of this outfit is, that it can be used in any position, as it can be hung up on the ceiling, screwed on the wall, table, etc.

SOOT-PROOF PLUG.

ONE of the most creditable advances in automobile-ignition systems is that embodied in the new patterns of the well-known "Soot-Proof" plug. This improvement in the 1906 "Soot-Proof" consists in the use of an accurately and perfectly indestructible insulating material, which is so markedly better than the insulating materials commonly used that the makers find it possible to sell it with an absolute guarantee of one year's life—agreeing to replace it within that time if anything goes wrong with it.

The other features that have given the "Soot-Proof" plug its excellent reputation are retained—notably the provision of the double air space, which produces a cleaning blast of gas as the small amount contained in it explodes. At the same time the extent of any deposit of soot through which short-circuiting might occur is made so great that the ordinary secondary current will leap the sparking terminals in the proper way, in preference to taking the long course over the soot. With this construction it even is claimed that a plug deliberately sooted with a candle will actually cleanse itself when placed in a motor.

Another detail worthy of note is the copper asbestos gasket, which permits the plug elements to be tightened solidly together, while yet allowing their ready separation at any time, without the annoying sticking that often is encountered with other constructions. The plug is sold at $1.50 with porcelain insulation, the new insulation bringing the price up to $2.00.

PITTSFIELD JEWEL PLUG.

THE Jewel Plug made by the Pittsfield Spark Coil Co., of Pittsfield, Mass., is of a new design. The mica core is ground to a perfect bevel and the shell on which it fits is bored to the same bevel, so that the core is held in place by simply inserting the core in the shell, and giving it a rap on the base of the electrode. To remove the core for cleaning, rap it on the upper end of the electrode on some solid surface, and it is immediately removed. The inside of the core is made of pure sheet mica wound around a solid steel electrode, which makes it absolutely proof against leaks or short circuits. Connection is made to the cable by a very simple brass terminal.



JUMP SPARK COILS

the very best, with ball bearing adjustment for vibrator Automobiles, Launches and Stationary Engines.

THE INDUCTION COIL CO., Milwaukee, Wis.

MOSLER SPIT-FIRE

The most reliable Sparking Plug. Used by all leading manufacturers.



A. B. Mosler & Co., 1879 B'way, N.Y.



Protect Your Automobile by Using the

PARKER LOCK-SWITCH

(The Only True Lock-Switch on the Market)
For particulars address
THE PARKER LOCK-SWITCH
Montclair, N. J.



"Kent Pocket Meters"
DEAD-BEAT
ACCURACY GUARANTEED
Volt Ammeters, 0-3 Volt, 0-100 Amp. Price, $6.00. Voltmeters, 0-3 Volt. Price, $3.00. Ammeters, 0-100 Amp. Price, $6.00.
Discount to Trade.
ATWATER KENT MFG. WORKS
1082 N. Sixth St., Philadelphia, Pa.

PACKARD ENAMELED CABLES

like all "Packard Products"—are standard



They insure your ignition system against all leakage. Samples and prices?

The Packard Electric Company, Warren Ohio, U.S.A.



The SNAPIT LOCKSWITCH

THIS SNAPIT SWITCH IS INDESTRUCTIBLE, DUST PROOF, THIEF PROOF AND ACCIDENT PROOF.

Made of Highly Polished Metal.
...An Ornament to any Automobile...
Price, $2.00

Send for Illustrated Booklet.

F. A. Goebel, 304 FRONT ST. HARRITAN, N.

1906



Price, $1.50

AMERICAN INDESTRUCTIBLE SPARK PLUG

Double insulated mica core. Soot proof. Indestructible. Lasts indefinitely. Equip your car with a set of these plugs and save further trouble and expense. We manufacture a full line of high grade Coils, Plugs, Timers, Ammeters, Switches, etc. Write for Catalog.

American Coil Company, Foxboro, Mass.



In other "Just as Good" 3-4-5-6 Cylinders

Price, $1.50 all sizes, Postpaid

THE EXCELSIOR

is the leader of Jump Spark Plugs. It is the only Plug that can be cleaned of soot and oil without removing it from the engine. Costs no more than the common kind which it outclasses in every feature. See us at New York Shows. Write for Bulletin "O".

EXCELSIOR SPARK PLUG CO., Cleveland, Ohio

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"Exide" SPARKING CELLS

These cells have been designed and assembled with great care, especial attention having been given to each detail, making them a practical ignition cell for gasoline engines in Automobiles and Auto Boats.

THE ELECTRIC STORAGE BATTERY CO. PHILADELPHIA, PA.

Depots for the prompt delivery and care of Exide Batteries:
PHILADELPHIA, 250 North Broad St.
NEW YORK, 49th St. and 9th Ave.
SAN FRANCISCO, 628 Howard St.
PASADENA, 33 South Raymond Ave.
MINNEAPOLIS, 36 Ave., South & 5th Sts.
ST. PAUL, 372 Minnesota St.
PITTSBURG, 5908 Centre Ave.
ROCHESTER, 158 South Ave.
PORTLAND, ORE., 140 Fifth St., N.
CLEVELAND, 404 Huron St.
DETROIT, 208 Jefferson Ave.
CHICAGO, 304 East Lake St.
LOS ANGELES, 334 S. Main St.
BUFFALO, 649 Main St.
BOSTON, 39 Stanhope St.
SAVANNAH, 308 Bull St.
ST. LOUIS, 3044 Olive St.
DENVER, 1449 Clarkson St.

SALES OFFICES: New York Boston Chicago St. Louis Cleveland San Francisco Toronto, Canada

"National Batteries" for ELECTRIC VEHICLES
NEW YORK CITY BATTERY DEPOT:
SMITH & MABLEY, Inc.
57th St. & Broadway

RELIABLE
National Battery Company
ELECTRIC STORAGE BATTERIES
BUFFALO, N. Y.

"National Sparkers" for GAS MOTORS
BRANCH OFFICES:
NEW YORK
CHICAGO



TRITT DASH COILS Are superior to ALL other Coils because they are made on the Unit Plan

Having all connections made without binding posts, nuts or screws. They have the swiftest vibrator ever made (We except none) Every unit is absolutely

Interchangeable and Automatic

In a recent test by a large automobile company, it was a TRITT coil that set the pace for all others.

THE TRITT ELECTRIC CO., Union City, Ind.











THE desirable click and swing of your engine is only obtainable through a faultless ignition service. For over fifteen years we have been making the finest automobile ignition material, and our growing export trade shows that we are successful competitors in the European market. It will well repay you and cost you nothing to write for our "Pocket Book of Ignition." It is free for the asking.

Herz & Co., Civil Engineers, 187 Elm St., New York City











Witherbee Storage Battery Igniter

Now Used and Endorsed by 48 of the Leading Automobile and Motor Boat Manufacturers.

Can you afford to consider anything else for your '06 Car?

"Every Battery Guaranteed, every Customer Satisfied." Over 12,000 Batteries now in use. Suitable for any Gas or Gasoline Engine using Make and Break or Jump Spark Ignition.



Recognised as the Most Satisfactory Means of Ignition.

Every Battery Guaranteed to give Satisfaction or Purchase Money Refunded.

When ordering your Car insist on having the WITHERBEE and avoid all ignition troubles.

Endorsed by the Leading Manufacturers. Sold by the Leading Jobbers.

Write for Descriptive Pamphlet.

WITHERBEE IGNITER CO., 541-543 West 43d St., New York

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NATIONAL COILS

For 1906



Highest Possible Speed of VIBRATORS

Non-Sparking at Platinum Points

Insulations of Windings Absolutely Perfect

Write for full information regarding the radical features incorporated in our new line.

National Coil Co.
Lansing, Mich., U. S. A.

"SOOT-PROOF" PLUG.



The most economical plug on the market, because it lasts so long.

The Spark Always Jumps.

No amount of Carbon can make it short circuit.

The porcelain is large, strong and non-absorbent, and cannot break under a temperature of 2500 degrees.

No knowledge needed for repairs. All parts interchangeable.

Beware of infringed imitations.

Write for free treatise telling how to correct and avoid electrical equipment troubles of gasoline motor cars.



It Was Real Merit

that made the "Soot-Proof" Spark Plugs win the McFlurry Medal in the Six Day National Economy Contest.

Ninety per cent. of all contests won in America were won by cars using "Soot-Proof" Plugs.

Specify them when ordering cars. It will save you trouble. Imitations? Sure, but that's flattery.

Indestructible, $2.00. Regular, $1.50.

Guaranteed:
YOUR JOBBER HAS THEM.

C. A. MEZGER, Inc., 203 W. 80th St., New York.

NATIONAL SALES CORPORATION
Factory Sales Managers. 256 Broadway, New York.

The Apple Automatic Battery Charger



is the new and central feature of the 1906 Apple Ignition System.

It is the **best dynamo made in the world,** regardless of size or use for which it is intended.

It uses electro-magnets, electrically formed by current generated by the dynamo itself. Incomparably superior to magnetos, which are equipped with so-called permanent magnets, but which really deteriorate rapidly when exposed to heat and vibration.

It keeps the batteries always full of "juice," so that you can rely on a strong, steady current, with a fat, hot spark at all times.

The complete Apple Ignition System consists of Apple Automatic Storage Battery Charger, the Apple Storage Battery, the Apple Automatic Cut-Out, with all necessary coils, plugs and timers.

It has been recently improved in many details, and offers for 1906 a better system than has ever been obtainable before for securing ignition.

You can purchase the system entire, or any part as desired.

Write to-day, if you want complete information.

THE DAYTON ELECTRICAL MANUFACTURING CO.

169 Beaver Bldg. Dayton, Ohio

See our exhibit at Chicago Auto Show

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The Apple Storage Battery



is the only real PORTABLE STORAGE BATTERY on the market.

¶ It is compact and practical, and gives ideal results for ignition work, or for lighting automobiles or motor boats.

¶ The spark it furnishes is of the "fat" intensely hot variety.

¶ It consists of lead bottle units, assembled in highly Japanned metal cases, each unit completely enclosed, sealed, and acid-tight.

¶ The vapor from charging is discharged at bottom of battery to ground, thus preventing corrosion of wires.

¶ It is impossible for the contents to slop over, or for any part of the battery to break.

¶ The positive plate is securely fastened so it cannot vibrate and break connections, as in other batteries. The inner surface of the lead bottle serves as negative plates, thus saving weight and decreasing complications.

¶ The Apple Storage Battery can be used independently, or as part of the Apple Ignition System.

¶ The Apple Ignition System for 1906 has been greatly improved and is better and more complete than ever. Write us and get full information about our system, and specify it on your new car.

The DAYTON ELECTRICAL MANUFACTURING COMPANY

169 Beaver Bldg.
DAYTON, OHIO

SEE OUR EXHIBIT AT CHICAGO AUTO SHOW

PITTSFIELD



Think a moment of the advantages of using the Ignitson Goods manufactured by the Pittsfield Spark Coil Co.

Our 1906 Coil is a revelation, the most rapid, economical, reliable and durable coil made in the world (not excepting any). You cannot puncture or rupture it, as the insulation is so perfect that it is proof against these troubles.

Our 1906 Commutator or Timer is the strongest, most reliable and most perfect ever invented, a positive contact guaranteed under any condition.

Our 1906 Special Jewel Mica Spark Plug is perfection, no more fouling or short circuiting, the sparking points and chamber between the core and the shell being thoroughly cleaned at every explosion in the cylinder.

Send for further information in regard to these goods before contracting for your 1906 requirements.

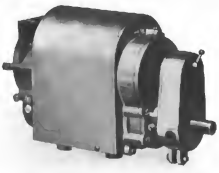
See our Exhibit at the Automobile Show, Madison Square Garden

Pittsfield Spark Coil Co., PITTSFIELD, MASS.

REMY 1906 MAGNETOS

The simplest and highest grade ignition apparatus that can be used with the four-cylinder automobile motor.

The electrical design is superior, and the mechanical construction equal to the best foreign made apparatus, and far above comparison with other American made mechanical ignition apparatus.



It is used upon more high-priced 1906 American made cars than all other Magnetos and Dynamos combined.

We will exhibit at Chicago Automobile show.

REMY ELECTRIC CO.
ANDERSON, IND.

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SUNDRIES AND ACCESSORIES AT THE SHOWS

ACCESSORIES.

Of various recorders of speed distance and other facts interesting, and often of high moment to the motorist, there was an abundance. The Veeder Odometer, to learn the distance your wheel travels per revolution, and their Speedometer, were of course among the number, as well as their Tachodometer, which works like a thermometer, showing the results in a red liquid in a tube. The Jones Combination Speedometer-Odometer, showing the speed in miles per hour, and the cumulative miles of the season up to 10,000, were also on exhibition, as were also the products of the Webb Co., the Rollins Manufacturing Co., and the Hicks Speed Indicator Co.

Horns have been one of the features of the accessories of the past year, of which the Gabriel Horn may well claim first place, for they have set a vogue, closely followed by the Tritone Whistle of the New York Sporting Goods Co., and followed by the "New Siren," the "Organ" Horn and Hutchinson's Electric Horn, and the Siren Horn of E. J. Willis.

The great general supply houses of imported and domestic accessories had full lines of all their varied goods. The Automobile Supply House of New York showed the Wilson Auto Clock, fit from the top, electrical ignition apparatus, the batteries of Peto & Radford, of London, the Dae Magneto, Heinz batteries, Soms' shock absorber and Dupont's Siren from Paris. Of Charles E. Miller's display it is hard to say what it did not consist of, as is natural when so great a stock as theirs can be drawn upon. Their special catalogue was the show in miniature, all except the car, and nearly the same remark applies to the well-known New York Sporting Goods Co.

Of fabrics the Gilbert Manufacturing Co. displayed specimens of their robes, auto covers, tire cases, leggings, lamp covers, sleeve protectors and lap robes, from under which, although made in one piece, the foot lever can be operated freely.

The world of mufflers, which have made winter automobiling a pleasure, was divided between the Scott muffler, displayed by the J. G Judson Co., and Way's muffler. Of course not a tenth part of the extensive patterns of this firm were shown. These mufflers though ostensibly invented for the use of the automobilist are finding favor on the water as well as on land, and amongst skaters, engineers, and sportsmen generally. They are a vital preventive against our climatic uncertainties.

Another essential for the prevention of an evil almost as troublesome as a cold was William Hiram Brown's dust guards, which though simple and easily added to any car, effectually deflect the dust and prevent its settling on the machine and its inmates, and they do not obstruct the view; in fact are hardly visible, but they are effectual.

For eliminating the threatened of continually putting the brake on and taking it off by foot, the Waters power brake, which works exactly like an air brake, but uses spent gas from the engine, was shown by the Gas Engine and Whistle Co.

A place for everything carried on a car, and everything in its place, is provided by the high grade leather hampers made and shown by John Boyle Co. They are made to fit all the leading grades of cars.

For the safety of the car when at home E. F. Hodgson has manufactured an excellent portable garage, and had an exhibit in the basement of the Garden. It is well designed for one car and of sterling workmanship and material, and for its safety when it is necessary to leave the car in the street or in the garage, the Lock Switch Manufacturing Co. have invented a switch which will prevent its use, except when the owner knows it.

F. A. Goebel of Marietta showed an exceedingly simple lock switch for use on automobiles and motor boats, "the knife switch," and when the current is turned off the switch is locked; the "Snapit" is thief proof, dust proof, and weather proof.

The Gleason-Peters Co. air pumps were in strong evidence in great varieties, not only for automobiles, but for all other purposes where compressed air is required. It is not necessary at this late day to specify the Gleason-Peters pumps in more detail.

And finally the U. S. Emergency Case Co. have done a meritorious thing in putting up exactly the paraphernalia, dressings, instruments, and ingredients which are immediately required in case of any accidental injury, and would otherwise sometimes be difficult to get near where they were wanted. It takes but a small space but should never be absent at roll call.

The Carbondale Chemical Co., of Syracuse, had samples of their "Kal Krystal," a non-freezing and non-corroding jacket solution, made in crystal and put up in small packages.

"Kal-Krystal" is neutral in its reaction, and, therefore, has no corrosive effect upon the water tank, radiator, and connections of the circulating system; it is not decomposed by heat, its boiling point, at the strength ordinarily used, being 220° Fahr.; it evaporates until a certain density has been reached; then no further evaporation occurs.

It dissolves readily, forming a clear water-white solution which is free from every trace of sediment. A 10 pound can, dissolved in six quarts of warm water, makes two gallons of solution ready for use, which will not freeze at 30° below zero Fahr.

It is practically chemically pure, and therefore uniform in its composition; being free from sodium and magnesium chlorides, it is absolutely non-corrosive, thus differing from other solutions.

LAMPS.

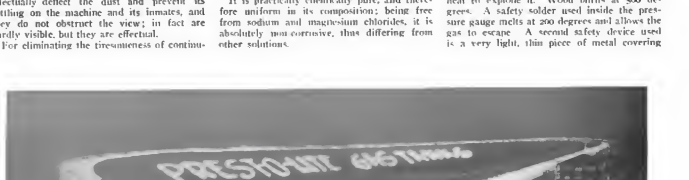
LAMPS were a centre of never-ending interest, prominent among the exhibits being the display of the Dietz Motor Oil lamps, headlights, tail lights, searchlights, and Acetylene Gas generators. The Badger Brass Mfg. Co. were well represented by a collection of "Solar" lamps and searchlights and lanterns, and their model Solar gas generators. Smith & Mabley exhibited specimens of the "Billy" lamps, Auto-generator projector with condenser and for independent generator as well as side lamps for oil and gasoline. The Rose Mfg. Co. had on show one of their "Never Out" Invertible Gas producers, which use gas only when needed, eliminating all danger of explosion, and the Prest-o-lite Co. one of their acteylene tanks, from which a large and unfailing supply of gas is at hand for use in any number of lights for months. The Motor Car Equipment Co. sent 15 styles of the highest quality, latest designed, beautiful lamps in their general exhibit. The Imperial Brass Mfg. Co. had an ingenious mechanism by which the lamps, on approaching a turn, were revolved so as to point ahead of the car before it took the turn.

A novelty in lamps shown which was really entirely new in design was the Climax Belle motor lamp, manufactured by Sibley & Pitman. One of its features is the fact that it has no unsightly chimney, and that the ventilators run around the body of the lamp. The bracket lugs are concealed and the lamp opens on either end, making all parts of the lamp very accessible.

The Prest-o-lite headlight tanks, which ensure a headlight making the road as plain as day, were displayed at the show, but, of course, not by way of demonstration, for no lamps were allowed to be shown alight.

The Prest-o-lite gas tanks were designed to take the place of carbide generators. The Prest-o-lite gas tank, size A, contains 70 feet; size B 40 feet of pure, clean gas, always ready to use. To operate the tank one only needs a key for the valve and a match. Of course the first cost is more than the cost of an ordinary generator, but the final cost is not, because the heat from decomposing carbide will in time wear out any generator while the Prest-o-lite gas tank is practically indestructible. Pure acetylene compressed cannot be exploded by concussion, for even with a spark plug inside of the tank it would be impossible to get a general explosion without having a proper air mixture.

Acetylene requires over 1,400 degrees of heat to explode it. Wood burns at 500 degrees. A safety solder used inside the pressure gauge melts at 200 degrees and allows the gas to escape. A second safety device used is a very light, thin piece of metal covering



A BIRD'S EYE VIEW OF THE INDIANAPOLIS FAIR GROUNDS TRACK ON THE NIGHT OF NOV. 16-17, WHEN THE NATIONAL MOTOR CAR CO. WAS BREAKING THE WORLD'S 1000 MILE AND WORLD'S 24 HOUR RECORDS.

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a plug which ruptures at 500 pounds pressure and allows the gas to escape. As a matter of fact, when a tank is charged at the factory it is filled with more pressure than it would ever have after it is sent out, unless it were exposed to a severe fire in a burning building, which would cause the gas to expand, and upon reaching the pressure of 500 pounds the safety plug would break and the gas would find an exit.

The Prest-o-lite gas tank is a seamless steel tank, heavily copper plated, wholly without bolts, nuts, thumb screws, washers, or gaskets, and the tank may be attached to any part of the car by two polished bands drilled for screws or bolts. A pressure gauge in the end shows at once the amount of gas available.

The company is also making a more compressed air tank for garage use, which will fill 400 tires, and which they ship filled with compressed air. The tank has a large steel cylinder 9 inches in diameter and 40 inches long, fitted on a two-wheel truck, the total weight being 125 pounds. A smaller size weighing 25 pounds is of 4 inches diameter, 15 inches long, and having a pumping capacity of 50 tires, the small Prest-o-lite gas tank having a capacity of 2 lights for 50 hours, and the large tank has a capacity of 2 lights for 85 hours. Over 8,000 of these tanks were put in use during the last six months.

The sketch on another page of this issue gives a faint idea of the appearance of the mile track at Indianapolis on the night of November 16, 1905, during the successful attempt on the 1,000-mile and 24-hour track records, made by a 35-40 horsepower National stock touring car, stripped. The sketch also gives somewhat of an idea of the wonderful illuminating power of the 400 Prest-o-lite gas tanks, which were placed at intervals of about thirteen feet all around the track at the pole.

This lighting arrangement was so superb that the drivers, Clemens and Merz, who alternated on the car during the run, declared that the big searchlights on the car were of no use and inadvisable, and they were extinguished on the first stop after nightfall. Not a light went out during the night, or caused any trouble.

The method of lighting the track was to use five hundred and thirty-six gas tanks, each one fitted with a large, square, white paste-board reflector; the reflector was tied on to the tank so that the light would reflect on the track and in an opposite direction from the driver's eyes. Each tank was fitted with a one-foot burner, which means that each tank was burning one foot of acetylene gas per hour; in other words, giving 15,000 c.p. of light per hour.

The track was patrolled all night long by four watchmen to serve a double purpose: First, to see that none of the tanks were stolen, and, second, to see that any that might be blown out by the heavy wind could be relighted.

The photograph shows complete details of the track and buildings, taken from the top of the Indianapolis Fair Grounds grandstand, or at an elevation of about one hundred and thirty feet.

There were five hundred and thirty-six tanks used to illuminate the track, the different repair stations, tire stations, eating stands, etc. An idea of the cost may be had from the fact that every one of the gas tanks was fitted with a one-foot special Tutt gas saving burner costing a dollar each. Each tank was also fitted with lute connection, tube support and shield. The cost to the Prest-o-lite company for lighting the track for the night was practically three thousand dollars.

TOOLS.

FROM carts to tools is a natural gradation which necessitates such a tool grinder as is supplied by Cook's Railway Appliance Co., of Kalamazoo, which may be attached in working position to a malleable iron column, or fastened to the floor of a hand car, or a bench or a post. The gears are encased in a malleable iron shell and the emery wheel, also encased, is separated from the gearings, a most ingenious and invaluable implement in the factory or repair shop. The Railway Appliances Co., of Chicago, introduced the "Auto-Ce," or automobile wrench, with a full line of sockets of pressed steel and a ratchet movement which works in either direction, but the wrench can be made solid by placing the ring in the center of the two ratchets. The whole machine is packed in a leather case, in the almost incredible space of 3 inches by 2 by 10. The "Detroit Combination Tool" comprises a forge, anvil, vise, pipe vise, emery wheel, drill press, vise clamps, crucible holder, twist drill and blacksmith's tongs; all in a length of 41 inches, a height of 10, a width of 12, and weighs only 135 lbs., and "The Champion Repair Kit" contains enough tools to make any repairs which can be made outside a shop.

Of lifting jacks there were many examples, prominent among which were the Barrett Automobile "Jacks" of the Duff Mfg. Co.; quick acting, automatic lowering in single acting or double acting styles, and the "Standard Jacks" of the Cook's Railway Appliance Co., weighing 8½ pounds, yet each capable of lifting one ton, and the Peerless "Jack" of the Oliver Mfg. Co.

OIL AND LUBRICANTS.

OILS, lubricants and greases are important accessories, and are well represented by the Columbia Lubricants Co. of New York, with their "Monogram" oils and greases; The Non-Fluid Oils of the N. Y. & N. J. Lubricant Co., which do not feed too fast in hot weather; by the Albany greases made by Adam Cook's Sons of New York, with special grades for summer and winter of the same grades of quality, differing only in consistency. Among the other exhibits were the Hausemyer Oils, W. P. Muller's "Excelsior Gear Case" and other oils, and R. M. Hollingshead's "Whiz" specialties and S. F. Bowser with lubricating oil storage cabinets, etc.

In lubricators the Madison-Kipp Lubricator Co. exhibited their "Valveless Wonder" which will pump against any pressure. It is made in any number of feeds. It is readily adapted to any automobile on the market and no sight feeds are necessary; and Greene, Tweed & Co. their "Multiplus" Lubricators, which can be instantly turned back and forth from 10 to 8 feeds. Of another sort of oilers, the hand syringe feeder, the Randall-Faichney exhibited a mechanical triumph made entirely of metal, the plunger being ground to fit as perfectly as a piston in an engine.

SHOCK ABSORBERS.

THE increasing interest in spring suspension, and the growing belief that something better in this regard can be found than the conventional spring arrangements afford, are indicated by the large number of auxiliary spring and shock cushioning devices exhibited. A simple spring device is the Sager Equalizing Spring, which is simply a helical spring with clips for attaching it to the frame and axle. It is intended to supplement the regular springs, and by relieving the latter of part of their load it allows the axle a livelier movement over small road inequalities, before the body is affected. More elaborate is the Cliff Automobile Wheel, which runs on ball bearings on a large non-rotating hub, which is supported internally on a helical compression spring and guided vertically by a suitable formation of the axle end. Thus the wheel and the hub on which it turns can vibrate vertically on the "lively" helical spring, and transmit only a moderate portion of their movement to the heavier and more inert axle. The keynote of the device lies in the difference between the lively action of the helical spring, which takes care of small and rapid road vibrations, and the "lazy" action of the regular leaf springs, which are little affected save by the heavier jolts.

Among friction shock absorbers were seen the familiar Truffault-Hartford, which now has a spring washer claimed to dispense with the need for frequent adjustment; the Diezemann, whose especial features are the use of fibre instead of leather and the use of an oil-tight case around the friction disks; the Baldwin, which has a cam action which checks the rebound of the springs, but not their compression; and the Hotchkiss, which is really a glycerine dashpot with a by-pass and check valve which permit free movement on the compression, but check the rebound.

THE HARTFORD SUSPENSION.

THE well-known Hartford-Truffault suspension has had added to it a number of changes so that it will be automatic in its adjustment for wear and also easier to attach to the frame of a motor-car. An entire new model has been produced called Model H. It is made wholly of spring steel, excepting the leather friction disks, all the parts being held together by a central stud. The arms move upon a hardened and ground-steel bushing on this stud, a large steel washer pressing together the arms. This steel washer has five prongs so fitted that the lost motion, if any, is taken up automatically without further attention.



THE NEW HARTFORD SUSPENSION.

Check nuts are wholly done away with in the new construction; an adjusting nut being fitted with an improved locking device. Before being sent out for use every set of suspensions is adjusted by test to an equal tension, which it is expected they will retain for an indeterminate length of time.

The outer arms constitute a rigid construction, being joined firmly, but the center arm moves between these two outer arms, giving a vertical movement only, which is, it is said, an improvement over previous construction, because there was always a danger in that type of a shearing off effect.

DIEZMANN SHOCK ABSORBER.

THE Diezmann Shock Absorber consists of heads or plates and fibre friction disks, a bronze casing A, which contains steel a friction sprinkle being bolted directly to the side member of the chassis. The friction disks are packed in grease and are adapted for adjustment to yield the desired resistance by means of a screw plug B. By this means the amount of friction necessary to effect the desired retardation or resistance may be obtained. This adjusting plug, B, is held in position by the copper-seated locking device, C. A lever, D, is connected at one end to the friction spindle working in the casing, A, and its other end to one end of a connecting link, which is pivotally secured to a plate, F, mounted upon the vehicle axle or spring. The joint, E, consists of a tapered stud working in a fibre bushing for the taking up of any possible wear.

The friction services are packed in grease, of which a reserve supply is maintained between the steel heads or plates, and the apparatus being absolutely dirt and air-tight,

(Continued on page 106.)

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THE AUTOMOBILE EQUIPMENT CO

A WORD TO THE WISE

Regarding 1906 Equipment

WRITE EARLY for COMPLETE CATALOGUE OF

MOTOR CAR ACCESSORIES

We are pleased to add the names of interested motorists to our mailing list. For FEBRUARY we offer some very attractive prices to those buying early in the season.

NO MATTER WHAT YOU WANT WRITE TO US—WE HAVE IT

TOPS! NOW IS THE TIME. Get you orders in at once. See our samples of Top Materials. Get our quotations before ordering elsewhere.

DOLLARS SAVED! Fit, style, quality, finest workmanship guaranteed. We are ready for the 1906 Cars with complete line of our well-known specialties.

Chain Boots, invaluable for Chain Drive Cars.

Engine Cases or Mud Aprons, without such protection no car should be driven. Hundreds of these in use. Satisfaction warranted.

Also, the most carefully chosen stock in America of everything pertaining to an Automobile or Gas Engine.

Do not fail to get our prices on Lamps, Horns, Plugs, Storage Batteries, Carburetors, Coils, Tires, Tire Covers, Tire Chains, Non-Freezing Mixture, etc., etc.

YOU WILL FIND THEM RIGHT, AND YOU WILL FIND THE GOODS RIGHT. WE ARE OUT FOR A BIG VOLUME OF BUSINESS BY MAIL ORDER THIS YEAR, AND WE

MUST PLEASE OUR CUSTOMERS

253 Jefferson Avenue
DETROIT, MICH.

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The Auto Supply Co. INC.

1662 BROADWAY, N.Y.

Everything for Owner, Chauffeur and Auto

¶ You will find at our Broadway warerooms a more complete line of motor-car supplies than offered by any other firm in America. ¶ We keep constantly in stock every variety of motor accessory known in the field of motoring—lamps, clocks, horns, pumps, batteries, apparel, tools—every conceivable appliance used by the motorist can be found at our Broadway headquarters. If anything bought from us is not entirely satisfactory or exactly as represented, we will refund the purchase price. ¶ An experienced corps of salesmen are on hand to show you any or all lines, no matter whether you wish merely to investigate or to purchase.

¶ The unique success of the Auto Supply Company has brought out a small horde of competitors, who have adopted similar advertising, name, etc., in order to lead our trade astray. Beware, therefore, of imitators—remember, there is only one original motor-car supply house—"The Auto Supply Co., 1662 Broadway, New York City." ¶ Write for a free copy of our Sixth Annual Catalog. Same contains numerous novelties of interest to all users of automobiles. We are listing the products of reputable manufacturers only.





The Auto Supply Co. INC.

1662 BROADWAY, N.Y.

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GILBERT MFG. CO.



In presenting our 1906 line of Automobile Fabric Supplies we have endeavored to furnish articles for which there is a real and growing demand.

We believe Automobile owners require the BEST, therefore we offer no cheap, unsuitable trash. GILBERT supplies are strictly high grade in every respect, and sell at reasonable prices.

CAUTION. All genuine GILBERT supplies have the name GILBERT stamped inside, also our trade-mark, a label having the name "GILBERT — TRADE-MARK" woven in the label—and stitched inside each article.

In purchasing, look for this evidence that you are getting the genuine, as many cheap, spurious articles are being offered as being GILBERT make.



GILBERT TIRE CASE

New Ring Fastening

Can be put on or off in thirty seconds. Guaranteed water tight. Price for all sizes

$4.00





TIRE BANDS

Sold by all Prominent Supply Houses and Dealers



INNER TUBE CASE

Gilbert Manufacturing Co.

NEW HAVEN, CONN.

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THE CELEBRATED

BRAMPTON CHAIN

Insist on having this chain on your 1906 car. It will not cost you or the manufacturer any more than any other make of chain

We are sole United States Agents for this line of chains, and are ready to quote manufacturers on American standard sizes at same price as American made chain



No. 6—FULL SIZE

THE BRAMPTON CONNECTING LINK

The Celebrated Brampton Chains are fitted with connecting links as per illustration. It may not be necessary to have such a secure fastening, but Brampton thinks this the proper kind. **A chain is no stronger than its weakest link.**

BRAMPTON CHAINS HAVE NO WEAK LINKS

CHARLES E. MILLER

Manufacturer, Jobber, Exporter and Importer

HOME OFFICE: 97-99-101 READE STREET, NEW YORK CITY

BRANCHES—Broadway and 58th St., New York, 218 and 220 N. Broad St., Philadelphia, Pa., 504 and 504 Columbus Ave., Boston, Mass., 406 Erie St., Cleveland, O., 824 Main St., Buffalo, 227½ and 229 Jefferson Ave., Detroit.

CATALOGUE MAILED ON REQUEST.

RADIATORS



We claim to manufacture the best radiator made in this country at the present time.

This may seem like an extravagant claim but it can be fully substantiated by examination and test. They are high grade in every respect.

We make cellular, also flat tube radiators of several designs, all fully covered by patents.

Why not investigate our radiator before placing your order for 1906?

We guarantee better efficiencies than any other company existing.

Write for further information.

THE MAYO RADIATOR CO.

State and Mill River Sts., NEW HAVEN, CONN.

TRITONE WHISTLES

Our "Tritone" Whistles are licensed under Patent No. 783,748. They can be legally and easily attached to any car. They are solidly constructed, musical, handsome and fairly priced.



$12.00 Made by Motor Goods Mfg. Co., for whom we are exclusive selling agents. Electrotypes furnished free to jobbers and delivery guaranteed. **$12.00**

SUNLYTE RELIABLE LAMPS

All "Sunlyte" lamps are made of heavy gauge brass, lustre finished, and the parts screwed together and then riveted. The fronts and back both open, permitting easy accessibility for cleaning. They are built for service, are attractive in appearance, and yet are sold at popular prices. Search light or French type.



French Type, $12.50



"A Generator That Generates," $10.00



Rigid Search Light, $10.00

Fitted with B & L Reflectors, 7¾ in. front. Polished brass with copper front and back. Equal in light giving qualities to the usual 6 in lamp. Strongly built and always reliable.



With Swinging Bracket, $12.50

MARCHAND FRENCH HORNS



Dragon Style, $10.00

Every part of Marchand horns are made in Paris. The tube is attached at an angle of 135 degrees and is heavily braced, preventing breakage at the point of contact. The double turn is tapered on a true musical scale and makes a long sounding chamber, giving the horn a deep bass tone. These horns are suitable equipment for high grade cars. Other styles from $1.25 to $12.50

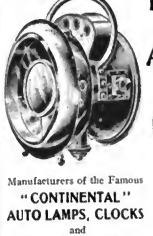
New York Sporting Goods Co.

"Near enough Broadway for convenience—far enough away for economy"

17 Warren St., New York, U. S. A.

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Manufacturers of the Famous
"CONTINENTAL"
AUTO LAMPS, CLOCKS
and
CALLIOPE HORNS

Importers of
ITALIAN CABLE
GOGGLE, SPARK PLUGS
AMMETERS, &c.

United States Agents for
The "BLANCHARD"
FRENCH HORNS

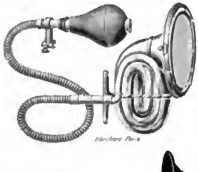
Sole Export Agents for
IMPERIAL WIXON PUMPS
"WEED"
CHAIN TIRE GRIP
"GEECEE"
DRY STORAGE BATTERY
"WEBER"
PORTABLE TURN-TABLES

Headquarters for
CONTINENTAL TIRES
"The World's Best"

The Motor Car Equipment Co.

Manufacturers, Importers, Distributors

Automobile Accessories



The Genuine "BLANCHARD" Sounds Like A Fog Horn
21 Styles
Latest Designs

The New French "SIREN" Sounds Like A Lioness







THE CONTINENTAL CALLIOPE

The Most Musical of its Type

SOUNDS LIKE AN ORGAN

55 WARREN ST., 1645-47 BROADWAY, NEW YORK

CANDY CARBIDE

For FRENCH AUTO LAMPS (Impregnine does be vide)
Packed only in 10 lb. cans. Price $2 each.
Discount to dealers in case lots of 12 cans.
SOLE MANUFACTURERS
ACETYLENE GAS ILLUMINATING CO.
108 WALKER STREET NEW YORK

THE SOLVAY PROCESS COMPANY'S "KAL-KRYSTAL"

MAKES THE BEST NON-FREEZING SOLUTION FOR AUTOMOBILE USE

Neutral and non-corrosive. Stands 40 degrees below zero. Puts up in 10-pound cans. Makes 5 gallons of solution ready for use. For sale by all Automobile Supply Houses.

CARBONDALE CHEMICAL CO., Carbondale, Pa.

"Tourist" Autokit

is made up of 30 of the very best selected tools obtainable, and is the highest type of repairing outfit for road use. The "Tourist" is especially arranged with reference to its quality and utility, and embodies every possible requirement and emergency value that can be included in a kit of this size.

Send for special circular No 1785

Hammacher, Schlemmer & Co.
Fourth Ave. and 13th St. New York Since 1848

BOSTON CYCLE AND SUNDRY CO.
The Automobile Supply House of New England
Do you need Fur Coats, Robes or Gloves?
INVESTIGATE OUR PRICES SAVE MONEY,
48 HANOVER ST., BOSTON, MASS.



Auto Screw Jack

Powerful Ratchet Double-Acting Screw Jack
Easy to Operate Quickly Adjusted

	Weight Each	Lifting Capacity	Adjustment
No. 901	6 lbs.	3,000 lbs.	11 to 17 in.
902	8 lbs.	4,000 lbs.	13 to 19 in.
903	12 lbs.	6,000 lbs.	14¾ to 23¾ in.

COVERT MFG. CO., - - Troy, N. Y.

LET US ACT

AS YOUR FACTORY

That is our business. We make anything mechanical in any metal. Particulars mailed on request.

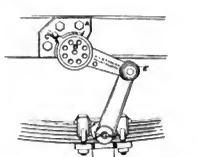
KALAMAZOO NOVELTY WORKS
112 ROSE STREET KALAMAZOO, MICH

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renders the appliances proof against the introduction of all foreign substances. Consequently nothing can get in or out, therefore the grease cannot waste.

The construction of the apparatus is such that it can readily be applied inside or outside of the chassis, or frame, and it rather adds to the general appearance of the car. A most interesting fact to remember is that the Diezmann shock absorber when once adjusted requires no further adjustment or regulation.

After making a test run of 5,000 miles with a set of Diezmann shock absorbers on a car, examination revealed that there was absolutely no further adjustment necessary, there being possibly no appreciable difference in the adjustment of the time of the adjustment of the run.



THE DIEZMANN SHOCK ARSORBER.

OF shock absorbing devices there were several new ones besides the familiar Truffault-Hartford Shock Absorber, the public recognition of which is the measure of its value as a method of controlling the vibration of the springs of the motor. The Baldwin Spring Recoil Check is another method of obtaining similar results. Its attachment to the body and axle is easily made, and so arranged that any oscillating or lateral movement of the car or running gear cannot strain or break its parts, and no oiling or adjusting is required. The Foster Shock Absorber, shown by the Gabriel Horn Co., is yet another addition to this class of invention; it is a small, light cylinder, the lower part of which contains oil; the sudden compression of the springs forces the plunger down and forces the oil into the upper chamber; when the recoil occurs the oil acts as a cushion and the plunger retards with a slow, steady pull. P. M. Horchkiss e- iointed an hydraulic eliminator to effect a like result, and the Sager Spring seeks to do so by a simple coil spring attached to the frame and the spring immediately over the axle.

The same object, in a minor degree, is aimed at by two other devices shown: The Werner Car Improvement Co.'s seat suspension, a yielding spring device beneath the ordinary seat ,the Sheldon Mfg. Co. by a compressed air cushion, and the Kilgore.

A Kansas City woman who owns and drives a neat little gasoline runabout had an accident recently by running into a buggy. As she was moving along very slowly and the buggy was standing still, very little damage resulted. The buggy was not harmed, but the auto's steering apparatus was slightly broken. The woman that evening was telling her husband of the accident.

"How did it occur?" he asked.

"Why," replied his wife, "I was just creeping along near the curb when a woman wearing the loveliest new polo turban I ever saw passed on the sidewalk and"——

"That's enough; I understand," replied her husband.

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IMPROVED

TRUFFAULT-HARTFORD

SHOCK ABSORBER

Insist that your car be equipped with the Improved Truffault-Hartford Shock Absorber

CARS UNDER 1,500 LBS.

$40

(Four Suspensions)



CARS OVER 1,500 LBS.

$60

(Four Suspensions)

Increases the speed.
Enables cars to proceed at highest speed over all obstructions.
Doubles the life of tires.

Prevents lost traction.
Absolutely prevents breaking of Springs.
Makes cobble-stones and rough roads seem like Asphalt.

NEW MODEL ABSOLUTELY SELF ADJUSTING
REQUIRES NO ATTENTION AFTER APPLICATION

Adopted by the Pierce Great Arrow, Locomobile, Matheson, Richard-Brasier, Peugeot, Napier Gobron-Brillié.

Don't be misled by devices made on principles which we have discarded.

HARTFORD SUSPENSION COMPANY

E. V. HARTFORD, Pres. 67 Vestry Street, NEW YORK

We are Sole American Agents for the Celebrated **GOBRON-BRILLIÉ** "The Finest Automobile in the World."

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Progressive and Up-to-date Automobilists

Protect their springs from jar and breakage by using

Foster Shock Brake

They are a new and unique device for relieving the strain on the Springs of automobiles regardless of any bump or sudden shock which the wheels may encounter



It is a small, light cylinder, made of cold drawn steel, with piston or plunger which is attached to the frame and which operates as follows: The lower portion of the cylinder contains oil. The sudden compression of the spring forces the plunger down against the oil and the plunger head is so constructed that when it comes in contact with the oil in the lower part of the cylinder, it forces it through 8 small holes in the valve disc in to the upper chamber, then when the recoil occurs, the oil acts as a cushion and the plunger rewards with a slow, steady pull, which prevents the jar and shock always occasioned by a sudden bump. The oil flows back into the lower chamber, a small portion at a time and thus relieves all strain and jar from the spring as well as eliminating all possibilities of a broken spring.

The Foster Brake is economical, simple, compact, substantial, weighing 2½ lbs., adjustable in every direction and can be placed on any machine

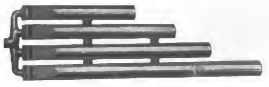
Patent Pending

Set of 2, $15.00 Set of 4, $30.00

Enjoy the rich chimes of the

Gabriel Horns

The Gabriel Horn is operated by merely pressing foot-pedal which enables you to give your entire attention to operating the car. The Gabriel Horn may be easily attached to any car, steam or gasoline. No reeds or bulbs to get out of order.



Has a beautifully modulated chime, which can be heard distinctly for a mile or more and warns without frightening.

Manufactured in 2, 3, 4 and 8 chimes. When purchasing be sure the horn bears our trade mark.

Write for prices and information

Manufactured By " " " "

GABRIEL HORN MANUFACTURING CO.

New York Representative, No. 148 West 56th Street

975 Hamilton Street, CLEVELAND, OHIO

A SPRING RECOIL CHECK



"HOUSE PATENT"



An automatic, frictional device perfectly controlling the recoil of the springs.

Its attachment to the body and axle of the car is easily made and so arranged that it is flexible, so that any oscillating or lateral movement of the car or running gear cannot strain or break its parts, and no oiling or adjusting is required.

A protection against broken springs.

Prevents the quick recoil over rough places which lifts the rider from the seat and makes travel fatiguing.

Permits the free action of the springs over smooth roads, but steadies the movement of the car over rough places, and to a large degree relieves the weight from the tires when striking severe obstructions in the road. Makes fast riding, with comfort and safety, possible.

For fuller description send for circular. Dept. A.

BALDWIN CHAIN AND MANUFACTURING CO., Worcester, Mass.

SHOW SPACE: Coliseum, Chicago—No. 187

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Kilgore Auto Air Cushion

"SHOCK-ELIMINATORS"

(PATENT ALLOWED)

The Only Device which does not deaden the natural spring action on good roads and which (on bad roads) does take the **extra load** from the springs, and by **controlling** their too severe downward plunge **PREVENTS** weakening, flattening and breaking of same. Also controls perfectly the **Recoil** of the springs.

A PERFECT "Shock Eliminator" must control the spring action **down and up.**

We challenge anyone to prove to the contrary.

WHAT WOULD HAVE BEEN THE RESULT HAD THE SPRINGS ON MR. JACOBS' CAR BEEN UNCONTROLLED ON THE DOWN MOTION?

SMASHED WITHOUT DOUBT

CHICAGO, ILL., Dec. 7th, 1905.

Gentlemen:—I received the set of Kilgore Air Cushions, which you sent me for my 1905 Franklin Car. I tried them for a couple of weeks watching how they worked. I found that one of the cushions was not open enough, which caused it to bump. After having this fixed, I had occasion to take out a party of several, quite heavy people, right after a light snow had fallen. We struck two or three places where the street had been dug up and mounds built up at least 18 inches high. We were right on top of them before I could see them, so that we went over them at full speed. I was much surprised and delighted that my car came down on the other side as light as a bird and NO SIGN OF JAR to any one.

I am confident had I not had your cushions on my car, *I would have broken every spring under it.*

A few days after this I took the car out for a 25-mile ride over the frozen roads and struck some pretty rocky going, but I had no trouble whatever in the way of bouncing. I now feel that I can run over almost anything, even the famous "Glencoe Bumps," at full speed.

Yours truly,

Signed, L. S. JACOBS.

KILGORE AUTO AIR CUSHION CO., 47 Columbus Ave., Boston, Mass.



Ride Rough Roads Right!

BY USING

Diezemann's Shock-Absorbers

HOLLANDER & TANGEMAN

F. I. A. T.

Dec. 2nd. '05.

The Diezemann Shock Absorber Co.,
1311 Hudson St.,
Hoboken, N. J.

Gentlemen:-

We have found the Diezemann Shock Absorbers satisfactory in every way, and doing all you claim for them, and have decided to use them in preference to any other make.

Yours very truly,
HOLLANDER & TANGEMAN

Write for Booklet, showing Details of Construction and Copies of Testimonials to

Diezemann Shock Absorber Co.

1311 Hudson Street, Hoboken, N. J.

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New Jones Combination Speedometer-Odometer

FOR the dash board of your automobile. Indicates the *speed* with positive accuracy. Registers the Season mileage traveled in miles and tenths to 10,000. Registers the Trip mileage in miles and tenths to 100 miles. The mile figures are black; fractional miles red. The Trip register has a stop-watch *instantaneous* resetting stem. Speed is indicated and mileage cumulatively recorded whether the car goes forward or backward.

THE DASH BRACKET is *adjustable* to permit the instrument being set at any desired angle.

THE SHAFT CONNECTION is *adjustable* and permits the passing of the shaft through the floor and through or around either end of the car.

The principle and general construction of our new instrument remains essentially the same as in previous models—for the reason that the features of compactness and durability are made possible in their highest form.

Complete Catalogue upon request



JONES SPEEDOMETER, 135 West 32nd Street, NEW YORK



Combination Speed Indicator and Odometer
Price, $50.00
WE WANT LIVE AGENTS
Write for our Catalogue and Agency Proposition

HICKS SPEED INDICATOR AND ODOMETER

BEST WITHOUT COSTING MOST

Every Motorist should use a HICKS SPEED INDICATOR for the following Reasons:

ACCURACY: Records miles per hour, from one to fifty, with unerring accuracy. Absolutely no oscillation of index hand above or below indicated point of speed.

SIMPLICITY: Only three gear wheels are used, thus doing away with a lot of unnecessary gears and consequent friction.

LUBRICATION: An oil cup provides lubrication for all necessary parts.

DRIVE: Through a flexible shaft attached at bottom of instrument, thus obviating sharp bends in shaft and liability to break and derange same.

GUARANTEE. Each instrument fully guaranteed for one year.

COST: Cheaper than others

Special Instruments Registering 100 Miles per Hour. Made to Order. Price, $75.00.

See our Exhibit at the Chicago Show, Space 1453, First Regiment Armory. Also Space 126, Dept. C, Mechanics Hall, Boston.

HICKS SPEED INDICATOR CO.

1386 Bedford Ave., Brooklyn, N. Y.

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Avoid a Trip to the Police Court

The fine amounts to little—it's the hours of delay, the inconvenience and possible humiliation for you and for those in your company that try the patience and spoil the pleasure of the whole trip. All this can positively be avoided by equipping your car with

The Warner Auto-Meter

(Registers Speed and Distance)

This little instrument always *tells the truth.* It registers with ABSOLUTE ACCURACY from ¼ mile to 60 miles per hour. It attaches to any Automobile made.

Without it you never know your *exact speed* —and the temptation to go a little faster and a little faster is almost irrisistible—you know how it is. And you know, too, what happens to you and your party when you *think* you are going 8 miles an hour and the Policeman's stop-watch says 15.

Don't guess yourself into trouble KNOW and keep out of it. The Warner Auto-Meter is your salvation.

And it's your ONLY salvation.

Because the Warner Auto-Meter is the only speed indicator which is sensitive enough to be absolutely and unfailingly accurate at *speeds under 10 miles an hour.*

Because it's the only one which works perfectly in all positions and at all angles, on rough roads or smooth, up hill or down.

Because it's the only one which changes with the *speed alone* and in which the indicator does not dance back and forth from the jar of the car.

The Warner Auto-Meter is the only speed indicator which is actuated by the same fixed, unchangeable Magnetism which makes the Mariner's Compass reliable FOREVER under all conditions. No one else can use Magnetism to determine the speed of an Automobile, though it's the only *positive* and *sure* way. Because there is just one way in which Magnetism can successfully be used for this purpose and *we have Patented that way.*

There is nothing about the Warner Auto-Meter which can give out, or wear out, or get out of adjustment. It is the only speed-indicator made without cams, plates or levers, and in which there is *no friction.* Friction wears away the cams and levers in other speed indicators, which are necessarily so small that *1-1000 of an inch* wear will throw out the reading from *one to five miles per hour.*

One Warner Auto-Meter will last a lifetime. It is as sensitive as a Compass and as *Solid as a Rock.* Otherwise it couldn't stand our severe service-test, which is equivalent to a trip of

160,000 Miles at 50 Miles per Hour on Granite Pavements Riding Solid Tires.

The practical Warner Testing Machine is shown in Fig. 1. The wheel connection of the Auto-Meter is attached to a shaft running 200 revolutions per minute. Across this shaft lies a plank which is hinged at one end and has the Auto-Meter attached to the other. Braced to the shaft is a knob of steel, which at every revolution "bumps" the plank, giving to the Auto-Meter *200 shocks per minute* while it is showing a speed of *50 miles per hour.*

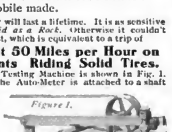


Figure 1.

Each one of these shocks is more severe than would be suffered in an entire season's riding. After running 10 hours a day for THREE MONTHS, actual tests show the Auto-Meter to be recording the speed with the same accuracy as at first within 1-1000 of 1%, or less than *6 inches per mile.*

No other Speed Indicator on earth could stand this Test.

This is why we sell **Ten Years Guarantee** and why each Auto-Meter on a ... we gladly renew any Auto-Meter (which has not been injured by accident) if the Magnet (the HEART of the instrument) is less accurate than 1-10 of 1% after 10 years use. We will gladly tell you more about this wonderful instrument if you will write us.

If you write TODAY, we will send you something every motorist will prize—our **Free Book—"Auto Pointers."**

THE WARNER INSTRUMENT CO., 118 Roosevelt Street, BELOIT, WIS.

(The Auto-Meter is on sale by all first-class dealers and at most Garages.)

Veeder

"It's Nice to Know How Far you Go."

—Veeder Odometers.

THE VEEDER MFG. CO.
24 SARGEANT STREET
HARTFORD, CONN.
Cyclometers, Odometers, Tachometers, Counters and Fine Castings

MAKE YOUR ENGINE PUMP



USE THE P. T. C. POWER TIRE PUMP

Save time and trouble and increase the life of your tires by keeping them properly pumped up

The Pacific Tucking and Mfg. Co.
471-473 18th Street, - Brooklyn, N. Y.

The Bullard Speed Recorder

Indispensable to Owners of Automobiles

Indicated time, 10.34 o'clock.



Let the Cop Know the Speed you go

It tells you the time, speed, distance, and makes a permanent record on a card of every mile traveled, when and how long stops were made and the total mileage for the season.

Indisputable Evidence in any Court of Law

AND A SURE PROTECTION TO EVERY HONEST AUTOMOBILIST.

Send for Booklet.

J. H. BULLARD, Springfield, Mass.

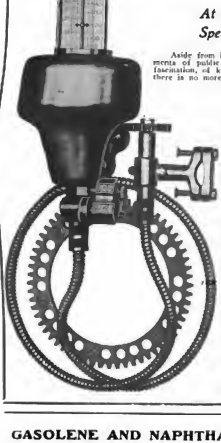
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NEW AUTOMOBILE SPEEDOMETER

The "Springfield"

At last a thoroughly reliable
Speed Indicator at a moderate price.



Aside from its assistance in complying with speed laws and the requirements of public safety, there is no questioning the satisfaction, the real fascination, of knowing the speed at which your touring car is going, and there is no more satisfying way of knowing than by having a "Springfield" combination Speedometer and Odometer on your dashboard.

No instrument at any cost will tell you more or tell it with more accuracy.

Its mechanical construction is the most correct and most direct application of centrifugal force; no cams or other indirect movements. Every motion is balanced and almost frictionless. All internal parts are of steel and hardened where advantageous. All bearings are self-lubricating. It is absolutely water and dust proof.

An exclusive feature of this instrument is the steady movement of the pointer. No jolts can divert it from its true position.

Its accurate indication of speed from 1 mile to the capacity of the dial is guaranteed.

The Dial is made of luminous material, and emits sufficient light to show position of pointer after dark.

Another exclusive feature is the safety device on our Universal pinion attaching Bracket. It will not only adjust up or down, out or in, and pivot both ways so as to fit to the steering knuckle of any American built car, but if the pinion should be thrown out of mesh with the gear by the lodging of any foreign substance, it will automatically return to the correct pitch line as soon as the gear clears itself. The Odometer in the reliable Veeder trip and non-resetting registering instrument, detachably mounted with a continuous gear drive.

FOR ANY SIZED WHEEL WITH JACKETED FLEXIBLE SHAFT. CORRECT LENGTH FOR ANY MAKE OF CAR

30 Mile Combination Speedometer and Odometer, $45.00
30 Mile Speedometer without Odometer $35.00
80 Mile Combination Speedometer and Odometer, $55.00
80 Mile Speedometer without Odometer $45.00

Patented in U. S. Oct. 10th, 1905. Patented in Canada, England and Europe. Other patents pending.

Manufactured by

THE R. H. SMITH MFG. CO.
SPRINGFIELD, MASS.

Established 1865 Incorporated 1883

THE Loring SPEED-GAUGE JAR PROOF



Most compact and most complete Stephard Trip Odometer Easily read Shows miles per hour minutes per mile and distance for season to 10,000 miles and repeat Hand absolutely steady under severest vibration and may be locked at any time for evidence. Flexible shaft shortest and most direct. Complete attaching fixtures, readily applied

Circular upon Request

E. J. LORING, Somerville, Mass.



The Motorist who use ca is equipped with the

WEED CHAIN TIRE GRIP

doesn't care a snap about snow or ice or mud or sand, or steepest hills. Safe, easy travel under all circumstances are assured to users of this ingenious device

Easily applied, requires but little car room; and the cost very moderate considering the great advantage

"An necessary as gasoline"

Weed Chain Tire Grip Co.
Office and Warehouse:
258 Mowre St., New York

GASOLENE AND NAPHTHA

Storage Tanks

Of All Sizes and Dimensions

L. O. KOVEN & BROTHER, Mfrs.
30 CLIFF STREET, NEW YORK



Stickney Safety Steam Generators Can be run dry without injury and instigated mileage on water and positive guarantee. We place them in your auto on trial.

PORTLAND GARAGE
Portland Maine

MENDENHALL'S ROAD MAPS

ROAD MAPS.—New York, 25c.; N. J., 50c.; Pa.,* 50c.; Bos. & P., 1 S. W. O., 25c.; N. E., 50c.; Ind., 25c.; S. Ind., 25c.; N. W. Ind., $1.00; Ill., 25c.; Mich., 25c.; Wis., 25c.; Iowa, 25c.; Mo., 25c.; Ky., 50c.

C. S. MENDENHALL, Publisher, 33 Opera Place, Cincinnati, O.

NOT A MIXTURE—A POLISH

"GLOBE" METAL POLISH

Does Not Rub Off or Rot Away the Metal. Imparts a Lasting, Brilliant Lustre to Any Metal. No Waste. No Scratching. No Scrubbing.

SOLD EVERYWHERE

LEA TIRE PUMP



Easy to use and the pressure gauge insures even inflation of all tires—makes them last longer.

Write for Illustrated booklet P, and proposition to agents.

William S. Jones, 112 Ninth Broad St., Philadelphia
Sole Builders Accept for Motor Car Speedometers, Toronto, Ont.

THE BURKE HILL CLIMBER



A positive preventive against skidding for Automobiles and Commercial Trucks. Is efficient in Sand, Mud, Snow and Ice.

Our Chain Repair Tool is the Best on the Market

J. C. BROWN MFG. CO.
BUTLER, IND.



Yankee Grade Meter

Price $7.50

Guaranteed to correctly measure the grade of any hill from 3 to 40%, can be read from back seat. Guaranteed for one year.

Manufactured by

E. J. WILLIS CO.
8 Park Place. New York.

HIGH-GRADE LAMPS
Acetylene Gas and Oil
ATWOOD MFG. CO
Amesbury, Mass.

NEW TIRE CASE



Quickest to adjust, easiest to put on, cheapest to use. Will fit any size tire. We furnish the common style with lace fastening if desired.

Lamp and auto covers, tool rolls, leggings and other auto fabric supplies.

Manufactured exclusively by
The WM. H. WILEY & SON CO.
Box 81, Hartford, Conn.

WILSON AUTO CLOCK

Only Auto Clock that

Tells the Time at Night

Water-Proof, Dust-Proof, Thief-Proof

Wilson Auto Clock Co., Inc.
937 Arch St., Phila. Pa



We will be at the
Sixty-ninth Regiment Armory
Automobile Show, New York
With a large Exhibit of
Standard Automobile Jacks
See us there
Cook's Railway Appliance Company
Successors to
Merrill-Stevens Mfg. Co.
KALAMAZOO, MICH
(No change in ownership or management)

The "SPRINGFIELD" TIRE TOOL



For removing any Clincher Tire from 24 to 40 inches. Impossible to injure the Tire. Weight, 1½ pounds. Price, $2.50 delivered. When ordering, give size of Tire

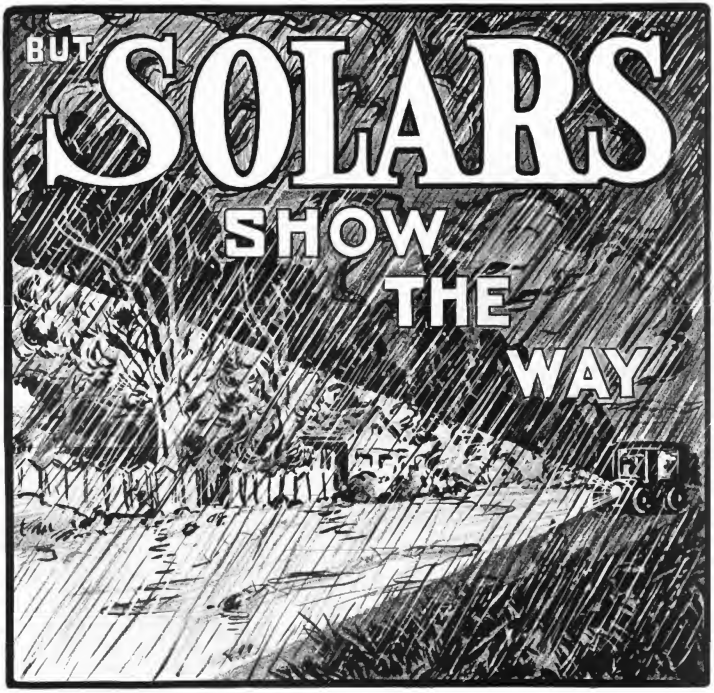
THE SHAWVER CO.
SPRINGFIELD, O.

Chauffeurs can best find a position by using the
Chauffeurs' Registration Bureau
1798 BROADWAY
SEND STAMPS FOR PARTICULARS

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'TWAS A DARK AND STORMY NIGHT



Chauffeurs large and chauffeurs small will all agree there is no motor lamp to penetrate the gloom like the solar. Various styles for various conditions. Send for booklet or ask your supply man.

BADGER BRASS MFG. CO.,

New York Office, 11 Warren St. **KENOSHA, WIS.**

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CLIMAX. BELLE



The Sensation of the New York Shows

Handsome in design.
Perfect in workmanship.
No unsightly chimney.
Concealed bracket lugs.
Powerful, highly polished condensing lens.

Open back and front, with patent safety locks on both doors.
All parts of the lamp get-at-able.
Riveted throughout.

Write for Catalogue and Prices.

SIBLEY & PITMAN

Manufacturers

CLIMAX MOTOR LAMPS — CLIMAX AUTO CELLS

26 WARREN STREET, NEW YORK

1906 | 20th Century | OIL & GAS LAMPS



Auto Lamps. First Quality Leading Styles. Variety of Shapes and Reflectors.



Bi and Motor Cycle, *Automobile*, Driving-Boat, Gas Hand Lanterns, etc.



Oval and Square GENERATORS that generate properly. Square and Oval Shaped. Original Improvements.



New Separate Generator, Bi and Motor Cycle Lamps.

House and Town Acetylene **GENERATORS.** A first-class, safe, simple and cheap system of Illumination for Country and Suburban Homes, Churches, Stores, etc.

Send for Catalogues

20th Century Mfg. Co.

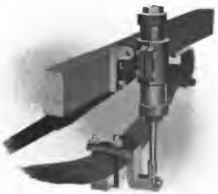
19 Warren Street Near B'way New York

THE PERFECTION AIR CUSHION.

THE Sheldan Manufacturing Company of Baltimore, Maryland, are placing upon the market the Perfection Air Cushion for vehicle springs which consists simply of an air chamber, and a piston rod with a double acting piston head. The air chamber can be attached to any part of the body of a vehicle or to the upper half of a full elliptic spring, and the piston rod to any part of the axle or any fixed point below or to the lower half of the full elliptic spring.

When the car drops into a rut or gutter in place of its going down with a sudden jolt it is eased down by the air chamber being forced down on the piston, and when the car comes up out of the rut or gutter or on to an obstruction like a railroad track it is eased up on an air cushion by the reverse action of the piston in the air chamber, thus the car gets no jolts, and there is no strain on the car by either the sudden upward or downward stroke as both movements are completely eased up by the compression in the air chamber because air is the most elastic substance known to science.

It saves the tires, relieves the vibration on all parts of the machine, and makes pleasant traveling over all kinds of roads.



THE "PERFECTION" AIR CUSHION.

KELSEY SELF-ADJUSTING SPRING SUSPENSION.

THE object of a spring suspension or shock absorber, as it is frequently called, should be to check the violent rebound of the springs after they may have been suddenly depressed. As these absorbers are generally made they set up a resistance in both directions; that is, when the body of the car lowers in going over a bump just as much friction is set up as when the spring tends to come back to its normal condition. This is entirely wrong, as there should be no friction when the body goes down, friction in that movement only robbing the spring of its true and correct elastic action. In other words, the ordinary shock absorber simply stiffens the spring to such an extent that it does not allow it to go down naturally or to rebound in proportion. It is the rebound that jars the passengers, not the down motion of the car body. With the Kelsey self-adjusting spring suspension there is a true action on the springs because the car is allowed to go down on the springs perfectly freely, the friction only taking place as the spring starts to rebound. The construction of the Kelsey device is very simple, and its action readily understood.

To the frame of the car is fastened a central disk, by bolts, C, C. This disk has four cam slots in its periphery, in which are the rollers, D, D, D, D. Bearing on these is a steel friction band, B, split crosswise to give a certain elasticity as the rollers come and

GRAY & DAVIS LAMPS



Hit the Bull's Eye of Perfection.
Be sure You have them on Your Car.

· GRAY & DAVIS ·
AMESBURY, MASS.

PHARES
C. BILLY



Smith & Mabley
Incorporated
SALESROOMS: Broadway, 56th and 57th Sts., NEW YORK
Sole eAgents in the United States for the celebrated
BILLY LAMPS
FOR AUTOMOBILES AND AUTOMOBILE BOATS

NEW PRICES



Our New Catalog lists everything that is new and good. We carry every article in Accessories that possesses merit. We always set the pace for low prices. Send 10 cts. for Catalog "A". FREE to dealers.

The BALL-FINTZE CO.
NEWARK, O.

Why



THE POPULARITY OF
THE E. & J. LAMPS ?

REASON

Finest material, Finest workmanship, Finest focus, Promptness in delivery.

INSIST

On your car being equipped with an "E. & J." thereby insuring Light, Safety, Satisfaction.

Manufactured by
The Edmunds & Jones Mfg. Co.
327 Riopelle St., DETROIT, MICH.

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Dietz Lamps

Oil Motor Lamps for 1906

The Highest Grade Lamps in Operation, Workmanship and Style



Peerless W
List $9.00 Each

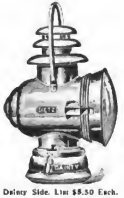
Our new styles for 1906 are the acme of finish, and your car will not be as complete as it should be unless you have it fitted with Dietz Lamps.

As in the past Dietz Lamps are furnished with the most convenient devices for operation of any on the market. They have drawn aluminum reflectors easily removable for cleaning. The reflectors are properly shaped and focused so as to get complete advantage from the dome.

In securing convenience of operation, beauty of form and excellence of workmanship, we do not overlook that most important point—the ability to Stay Alight and give a good light under all circumstances. Send for booklet.



Peerless R. List $7.00 Each.



Dainty Side. List $8.50 Each.



Peerless O. List $5.50 Each

R. E. DIETZ COMPANY, 37 Laight Street, New York

Established 1840



THE OLD WAY

TAKE YOUR CHOICE

Not the easy way to clean your auto, carriage, wagon, or sleigh is with the

ARDREY VEHICLE WASHER

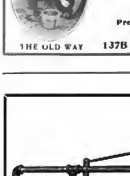
(Pat. Aug. 15, 1905.)

No cold hands. No soiled clothing. Cleans in ¼ the time.
Saves ¾ the work. Made of solid brass.
Fits any ordinary hose. Sponge always clean.
Impossible to scratch or injure finest finish.
Prepaid $3.00. Send to-day. Booklet FREE.

ARDREY VEHICLE WASHER COMPANY
137B Main Street Rochester, N. Y.



THE ARDREY WAY



Overhead Vehicle Washer

Illuminated or Plain

Only Illuminated Washer Made

Users are enthusiastic in its praise. Allows of washing at night or in a dark place, throwing the light where it is needed. Safe, strong, reliable.

A Necessity in all Garages, Club and Private Auto Stations. For Sale by all Dealers

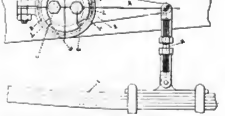
Send for Descriptive Catalog and prices

Vehicle Specialty Company

HARTFORD, CONN., U. S. A.

B. N. B. MILLER, 2228 N. Street
General Western Agent, Sacramento, Cal.

go. Surrounding this band is a fiber band, K, which takes the thrust between B, and the split hub, I, of the arm, A. The back end of the hub is split and has two extending lugs. Secured in the lower lug is a bolt which passes freely through the upper lug. Bearing on this lug and pivoted on the bolt is a cam with the upwardly extending arm, F, which in turn is



KELSEY SELF ADJUSTING SPRING SUSPENSION

connected to the arm, A, by the helical spring, G. This spring is adjustable in its tension by virtue of the rod passing through F. The arm, A, is connected by the adjustable rod, H, to the spring, I, of the car.

When the car goes over a hump, the frame, E, moves toward the spring, I, and consequently throws up the arm, A. This action is without resistance on the part of the device. When the frame and spring tend to separate, however, the four rollers engage with the friction band, B, and cause a braking action to take place between the friction band and the fiber band. The tension on the brake is at all times self-adjusting both as to tension and wear, by means of the cam bearing on the upper lug of the split hub and the spring, G, the degree of tension being governed by the eye bolt passing through F. This is obtained a self-adjusting suspension which only checks the rebound of the spring, allowing a natural action of the spring to its deflecting action

FOSTER SHOCK ABSORBER.

THE Gabriel Horn Manufacturing Company of Cleveland, Ohio, have invented and placed on the market a new shock absorber.

The Foster Shock Absorber is a new and unique device for relieving the strain on the springs of motor cars regardless of any bump or sudden shock which the wheels may encounter.

It is a small, light cylinder, made of cold



FOSTER SHOCK ABSORBER

drawn steel, with a piston or plunger which is attached to the frame and operates as follows: The lower portion of the cylinder contains oil. The sudden compression of the springs forces the plunger down against the oil, and

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BARRETT AUTOMOBILE JACKS

BARRETT'S PATENTS

are the only jacks on the market that may be operated conveniently without interference from the body of the car. The improved 1906 designs raise the car on the *downward* movement of the lever *only*—the upward stroke being perfectly free.



They are the only substantial and high grade jacks on the market that may be safely and continuously applied to medium or heavy weight cars.

Adopted by every leading manufacturer and operator and carried in stock by leading dealers.



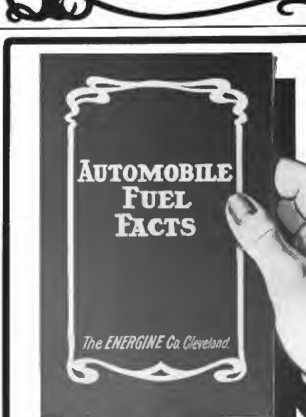
SEND FOR CATALOG "O-M," 1906

Manufactured only by

The Duff Manufacturing Co.

Works: ALLEGHENY, PA. ESTABLISHED 1883 PITTSBURG, PA.

New York Montreal London Paris Moscow



THIS BOOK IS FREE

The coupon attached will bring this handsome book FREE. As a means of enlightenment on the fuel question it is *valuable* to every automobile owner in the country. We want you to investigate. That's all. When we prove our claims, purchase ENERGINE. Not before. Send in the coupon to-day—NOW.

THE ENERGINE COMPANY

1799 Cuyahoga Building Cleveland, Ohio

Why Argue-Why Infer? Let Energine prove itself.

TAKE A PIN AND CUT THIS COUPON OUT

Please send me your book on "Auto Fuel Facts," also full information regarding the new fuel, "ENERGINE."

NAME

ST. and NO.

CITY and STATE

1799

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Save money on gas

¶ Don't buy gas under dangerously high pressure at a cost of $50 to $60 per thousand feet when you can easily, quickly and safely MAKE YOUR OWN GAS (of a better quality) at a cost of less than ½ cent per hour.

The Neverout
TRADE MARK

Patent Invertible

SAFETY GAS PRODUCER

for lighting motor-cars and boats, is built on an entirely new principle and makes gas only as needed—no danger of explosion.
Turn it on and it is ready to light instantly.
Turn it off and generation stops at once.

No After-generation, Odor or Waste



This light is projected with the greatest power and brilliancy by

The Neverout
TRADE MARK

MIRROR LENS SEARCHLIGHT

Money back if not satisfactory.

Write for free booklet.

ROSE MANUFACTURING CO. 914 Arch Street PHILADELPHIA

Largest searchlight factory in the world.



DID YOU EVER

attempt to take off a clincher tire without proper tools?

¶ The "Unedme" Tools are made especially for removing and putting on tires.

¶ Nickel plated. $2.50 per set.

¶ Our booklet tells all about them.

"UNEEDME" TOOL CO.
13 E. SPRING ST., COLUMBUS, OHIO

AUTOMOBILE ROAD MAPS

Catalogue Free. GEO. H. WALKER & CO., 201 High St., Boston, Mass. Near Rowes Wharf.



Even a boy

can lift a 6000 lb. car with a

"U. S." JACK

THE NEW HEAD fits the truss brace—square or round axle. Side motion to lever. Compact, strong, doesn't rattle, cannot drop. No. 1 10K inches high; weighs 3 ¾ lb

Price to introduce $2.25

THE "U. S. JACK CO.
25 S. Clarement Ave., Chicago, Ill.

WIGWARM PORTABLE GARAGE



SEND FOR CATALOG

E. F. Hodgson, Box 112, Dover, Mass.

the plunger head is so constructed that when it comes in contact with the oil in the lower part of the cylinder it forces it through two small valves into the upper chamber, then when the recoil occurs, the oil acts as a cushion and the plunger retards with a slow, steady pull which prevents the jar and shock always occasioned by a sudden bump. The oil flows back into the bottom chamber a small portion at a time and thus relieves all strain and jar from the spring.

The Foster Absorber is economical, simple, compact, substantial, and weighing but 2½ lbs., adjustable in every direction, and can be placed on any car.

THE "SPRINGFIELD" SPEEDOMETER.

THE advantages that would accrue to both motorists and the public from having a good speedometer installed on every motor-car in use are too apparent not to be generally conceded. So far their high price has limited the sale of these instruments.

It has been the aim of the inventors and manufacturers of the "Springfield" to produce a durable and thoroughly reliable speedometer at a price that would interest a large share of motor-car owners.

In this instrument by a novel application of the most approved form of centrifugal governor, the pointer rises by direct and positive action upon the face of a vertical indicating scale or dial, as shown in the illustration. It



THE SPRINGFIELD SPEEDOMETER.

is sensitive to the slightest variation of speed but cannot be diverted from its true position by any jolt or shock which the car may sustain. Its accurate indication of speed is guaranteed at all points on the scale.

Every motion is balanced and consequently nearly frictionless. All internal parts are of steel and hardened where advantageous. All bearings are self-lubricating. The ease is dust and waterproof. The dial is self-luminous and will show position of the pointer after dark. The case and trimmings are of phosphor bronze which matches the yellow brass fittings of most new cars.

The instrument attaches to the dashboard by a jointed bracket, permitting it to set at any desired angle. Each is supplied with a flexible shaft with improved double flexible jacket of correct length for the car on which it is to be used, but the bracket by which the pinion is attached to the steering knuckle is universal and will adjust in any direction so as to fit any American-built car.

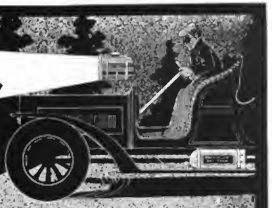
This bracket also has a valuable exclusive feature by which if the pinion should be thrown out of mesh with the gear on the hub by the lodging of any hard substance, it will not only cause no strain but will automatically return to the correct pitch line as soon as the gear has cleared itself.

Two standard instruments are being made, one for general use, registering from 1 to 50 miles, the other for high power cars, registering from 1 to 80 miles. Both sizes are offered

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PREST-O-LITE

GAS TANK



THE LIGHT THAT NEVER FAILS

DO YOU KNOW

that automobile manufacturers will equip your car with a Prest-o-lite Gas Tank, if you make the request when the car is purchased?

Prest-o-lite Gas Tanks do away with the troublesome, expensive and obnoxious carbide generator. It is the only SUCCESSFUL and PRACTICAL automobile gas equipment that has ever been produced—any automobile owner who has ever used a carbide generator will appreciate the Prest-o-lite Gas Tanks—no danger, dust, soiled bands or clothes—simply turn on the gas—it is ready at all times—and light it. When you have finished your run, turn off the gas—no carbide holder to empty, for fear of ruining the headlights.

Empty tanks exchanged by any dealer, at small cost. Exchange stations in all parts of the United States.

Prest-o-lite Gas Tanks are made in two sizes. Size A, 70 feet; size B, 40 feet.

THE PREST-O-LITE COMPANY, 330 North Illinois Street, Indianapolis, Ind.

EXCLUSIVE LICENSEES UNDER PATENTS OF THE COMMERCIAL ACETYLENE COMPANY, NEW YORK

GARAGES

Portable, and of Architectural Design

PRICE, $100.00 AND UP.





Portable Dwellings, Stables, Boat Houses, Camps and Out-Buildings of all Descriptions

PRICES ON APPLICATION

C. & A. Patented Building Construction Co.
170 BROADWAY, NEW YORK



The Brilliancy

of your AUTO can be quickly ruined by neglect or by the use of injurious soaps

FISK'S AUTO-CAR SOAP

Removes grease and mud from highly finished surfaces, whether wood or metal, and leaves neither streaks nor stains.

Use Fisk's AUTO-CAR SOAP

And preserve the original luster of your machine.

Price, in 5-lb. pails, $1.00, express paid. Special prices in quantities.

Fisk Mfg. Co., Springfield, Mass.

(Makers of Japanese Soap)

Established 1837.





Keep it new and bright with the new cleanser

MOBO

Elbow grease and common soap will not preserve the polish of an automobile. It may remove the dirt but the shine goes too. Mobo is unlike any other substance for cleaning automobiles, preserving and restoring the original lustre; removing grease and travel stains. Mobo is a preserver—it prevents blistering and cracking of the painted surface. Absolutely harmless to the hands. Can be used on the leather work of the automobile (also harness) as well as the wood and metal work.

Put up in 2 lb. and 8 lb. cans; also in tubs, half barrels and barrels. If your dealer hasn't it—tell us, we will see that you do get it.

JOHN T. STANLEY
644 W. 30th St. NEW YORK

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Dustless Motoring

BROWN'S DUST GUARDS

absolutely eliminate the dust nuisance in motoring.

Guaranteed to give satisfaction or money refunded.

Why be Dusty and Dirty when you can be perfectly clean?

The following is only one of many expressions from satisfied users.

Bloomington, Illinois,
June 13, 1905.
W. H. Brown, Chicago, Ill.

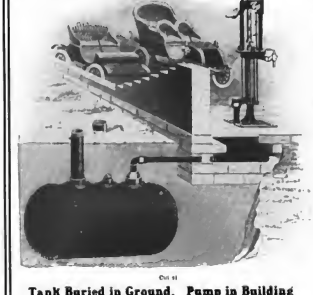
Dear Sir:—We herewith send you remittance to-day for your invoice ——. Our customer to whom we sold these Guards told us to-day that they were worth ten times their cost. He said he would not sell them for $100.00 if he could not get another set just like them. How soon could you furnish a set of Guards for model B Winton car ——?

Yours truly,
The Kerner-Van Leer Co.,
By B. C. Van Leer,
Sec'y & Treas.



Made to fit any automobile. Write for booklet. Visit our exhibit at the New York Auto Show, 69th Regiment Armory, Space 30 in Gallery.

W. H. BROWN, 208 Leader Building, CLEVELAND, OHIO.



Tank Buried in Ground. Pump in Building

Do You Use Gasolene?

If so, it will pay you to investigate the

Bowser System of Gasolene Storage

Bowser Tanks

prevent evaporation, preserve your gasolene, and reduce the fire risk to the minimum.

CATALOG IX

Contains some interesting facts regarding the safe, convenient and economical storage of gasolene. We shall be pleased to forward it upon request.

We invite you to visit our exhibits at the Boston and Chicago Automobile Shows.

S. F. BOWSER & CO., *Inc.*

Eastern Office:
255 Atlantic Avenue, Boston, Mass.

FORT WAYNE, IND.

with or without the Odometer, which is the well-known Veeder trip and season registering instrument.

The price of the 50-mile Speedometer and runner, $25 without Odometer, or $35 with. Price of 80-mile instrument, $35 and $45.

These instruments, which were exhibited in motion at both the New York shows, are made by the R. H. Smith Mfg. Co., of Springfield, Mass., who were established in 1865 and incorporated 1883, and have been awarded medals at Paris and other expositions for excellence of their manufactures.

BOYLE'S LEATHER HAMPERS.

John Boyle & Co., of 112 Duane Street, New York City, are manufacturing a line of leather hampers of luxurious appearance. They are designed to fit various popular cars. They are made of 8 ounce sole leather, which is treated to a patent leather finish. A stiff steel frame is used, and wood for the ends and bottom. Trunk handles are fitted to each end, and a heavy strap encircles the hamper. A substantial lock is provided covered with a flap of leather arranged to buckle down. A part of the top, which opens on a solid leather hinge, laps over the sides, making the case dust and water proof. Each case is provided with a heavy parafined duck cover. The firm also carries patent leather license pads and tool kits.

OILERS.

ONE great difficulty in motor-cars has been lack of an oiling system that will deliver to each bearing, wherever the motor is running, a desired quantity of oil in proportion to the speed of the motor. A new oiler, the Kinwood, can be regarded so that each feed will give from half a drop to fifteen drops for every three hundred and twenty revolutions of the driving shaft. It starts instantly the motor starts and ceases feeding instantly the motor stops.

Some systems have too much pressure, others have too little pressure, and in others the pressure varies with changes in speed. The Kinwood gives a pressure when needed and as needed by each individual lead and each pump can be individually worked by hand to flood its bearing without changing the adjustment.

Most systems have stuffing boxes below the oil level which are constantly leaking. The Kinwood has no stuffing box except above the oil level and therefore does not leak. The Kinwood adjustments are outside of the case; easily regulated but constant until changes are made.

The Kinwood oiler is very simple; no parts are subjected to unnecessary wear; not easily disarranged but easily accessible if necessary. It has large oil capacity in proportion to its bulk, and is light in weight and reliable.

JONES SPEEDOMETER-ODOMETER, NEW MODEL.

THE latest type of Jones Speedometer-Odometer is shown by the illustration. The principle of centrifugal force, on which the instruments are based, is retained in the new model for the reason that it admits of a simplicity of construction in which the features of compactness and durability are made possible of development in their highest form and assures positive accuracy and registration under all conditions.

The speed is indicated by the hand pointing to large readable figures on the metal dials. Dials are made to read the speed up to 50, 60 and 100 miles per hour.

The season mileage registers up to 10,000 miles. The trip mileage registers up to 100 miles and may be instantly reset to zero by a simple push of the button. This eliminates the trouble of "turning back."

In both the "Trip" and "Season" Odometer columns the miles are registered in large readable black figures and the tenths in red figures. Distance is registered cumulatively whether the car goes forward or backward.

The vertical shaft connection—adjustable—permits of passing the flexible shaft through the dashboard; down through the floor of the car, or around either end of the dash to either front ear wheel. The instruments are suitable for either right or left hand attachment.

The dash bracket occupies a triangular space on the dashboard 2½ inches high by 1½ base and is adjustable to permit of the instrument being set at any desired angle.

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The **"CHELSEA"** *Yacht Wheel*

STRIKING SHIP'S BELL CLOCK

Size (Dial)	4½,	6,	8½,	10,	12 inch
PRICE,	**$64,**	**$100,**	**$125,**	**$150**	**$175**
Height (about)	12,	17,	24,	28,	32 inch

8-DAY FINELY FINISHED, suitable for use in **COUNTRY ESTATES, CLUBS,** etc., or for a **PRESENT** to your **YACHTING** or **NAVY FRIEND. Fine PRIZE for REGATTAS**

Good opportunity on metal base for Special Engraving, etc. Also Ship's Bell Clocks in elegant Wood Mantel Cases for use in Parlors, Libraries, Hallways, etc.



Prices, **$42** to **$128** according to size, style and finish. Clock furnished in Round Case or with **BASE.** Large variety of finishes.

"The CHELSEA"

STRIKING SHIP'S BELL CLOCK

(Patented in the United States and Great Britain.)

8-DAY—HIGH GRADE

☞ Tells correctly each hour and each half hour. ☜ *For presentation purposes and as prizes for regattas, races, etc., the "CHELSEA" Clocks are in high favor.*

YOU want the **BEST?**
Ask for the **"CHELSEA" Clock**

☞ *ON SALE by Leading Dealers in Best Jewelry Yachting Supplies, etc.*

Chelsea Clock Co.

16 State Street Boston, Mass, U. S. A.

Largest Makers in America of Strictly 8-Day, High Grade, Ship's Bell Clocks, Marine Clocks, Auto-Clocks, etc.

MORGAN & ALLEN CO. *Sales Agents for*
124 Sutter Street San Francisco *Pacific Coast*



2¾ in. "SPECIAL" 8-DAY AUTO CLOCK (Trade Mark.)

Price $36. Has locked case. Shows dial on angle. The attractive "inner" clock has feet for using on mantels, etc. **Best on the market.**

Also 3 other 8-Day Clocks in Round Cases for use on Automobiles, Motor Boats, etc.



2¾ inch (Dial Size) Auto-Clock.....**$26**
3½ inch (Dial Size) Auto-Clock.....**28**
3½ inch (Dial Size) Motor Clock.....**24**

☞ All four of the above Clocks are in DUPLEX (Pat. applied for) Polished Cast Brass Cases; most thoroughly water-proof case on the market.

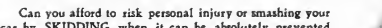


EXCELLENT **PRESENTS** for **YOU** to make to **YOUR YACHTING, NAVY OR AUTOMOBILE FRIEND.** ☞ **REGATTA** and **RACING COMMITTEES,** by selecting these **FINE CLOCKS,** as **PRIZES, PLEASE** the **WINNERS.** The Clocks are **ATTRACTIVE, APPROPRIATE, USEFUL** and of **GREAT MERIT.** Superior to other forms of Striking Clocks for House Use.

HEDGELAND SOLID AXLE



THE HEDGELAND SOLID AXLE and Differentiating NUTS.



This SPUR GEAR Differential is Eliminated by the use of the HEDGELAND SOLID AXLE.



This BEVEL GEAR Differential is Eliminated by use of the HEDGELAND SOLID AXLE.

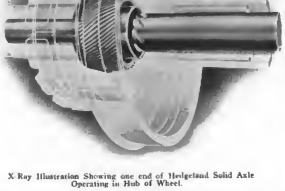
Why run the risk of life and smashing your machine when it is absolutely impossible to skid when your car is fitted with a HEDGELAND SOLID AXLE?

Can you afford to risk personal injury or smashing your car by SKIDDING when it can be absolutely prevented by replacing your differential gears with a HEDGELAND SOLID AXLE?

THE HEDGELAND SOLID AXLE GIVES A POSITIVE DRIVE ON both WHEELS.

SIMPLIFIES THE MACHINE AND INCREASES THE POWER.

SAVES THE TIRES AND TRANSMISSION.



X-Ray Illustration Showing one end of Hedgeland Solid Axle Operating in Hub of Wheel.

SEE OUR EXHIBIT AT CHICAGO SHOW

SIMPLICITY—SECURITY—SERVICE

Write for catalogue with full particulars and testimonials to

WEBSTER MFG. CO.

Eastern Branch—38 DEY STREET, N. Y. CITY
1078-1097 WEST 18th STREET, CHICAGO
Manufacturers & Distributors to the Retail Trade.

CONTROLLERS OF PATENT
Timken Roller Bearing Axle Co. Canton, Ohio
Weston-Mott Co., Utica, N. Y.
Manufacturers & Distributors to the Wholesale Trade

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Specify THE AUTOCHIME

on your 1906 machine

if you want the most practical Automobile Signal

WHY The Autochime is THE BEST

It is made of only one tube of finely polished brass, divided into compartments, and so constructed as to give a rich, musical chime.

It is blown by the exhaust from a few ounces to 300 lbs. pressure.

It is simple in construction, being made of only three parts, and is, therefore, easily taken apart when necessary.

It is small and compact in size, measuring only 15 inches in length.

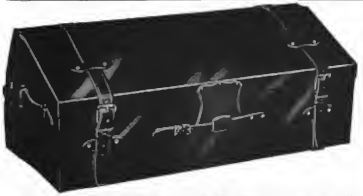
It has no soldered parts, therefore heat will not affect it.

The sound openings are well protected and will not clog up.

The price is **$15.00** *which includes valve and foot-pedal.*

By using The Autochime YOU STAND NO CHANCE OF PATENT LITIGATION

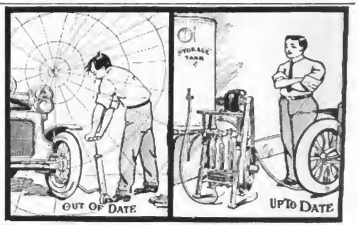
GRAY-HAWLEY MFG. CO., 605-609 Fort Street, West . . Detroit, Mich.



Before purchasing your **HAMPER** for your side entrance car, you should call and see a few of the many styles which we manufacture. All of these are made of sole leather, with patent-leather finish, and are absolutely dust and waterproof. In writing state style of car

JOHN BOYLE & CO., 112 & 114 Duane Street, Dept. L., **New York City**

We are also in position to furnish Rear Hampers for any side entrance car on the market.



Garage Equipments The modern garage must have AIR ON TAP at high pressure always ready for filling tires. We manufacture Power Compressors, Electric, $175 or Direct Driven from Counter Shaft. Full outfit of tanks, gauges and fittings—regular and special. Booklet for the asking. Estimates given on all kinds of air compressor outfits. **GLEASON-PETERS AIR PUMP Houston and Mercer Streets, New York City, U. S. A.**



Columbia Lens Mirror Lamps A, B, C, D *Columbia Generator No. 2 B. 24 Ounces Carbide.*

Columbia Generator, No. 2 B. 24 Onzes Carbide
Columbia Lens Mirror Lamps, A, B, C, D

Columbia Generators are the simplest and most efficient—no excess of gas, easy to charge and discharge.

Columbia Lamps are equipped with Genuine Bausch & Lomb Lens Mirrors—no cheap imitations.

Hine-Watt Mfg. Co., 58-60 Wabash Ave., Chicago, Ill.



Licensed and made under U. S. Patents No. 660,508, Aug. 21, 1900, No. 670,041, July 19, 1900, No. 715,115, Jan. 6, 1902.

It May Save Your Machine

ALSO

Your Life

FOR SAFE DRIVING AT NIGHT MUCH DEPENDS ON YOUR HEAD-LIGHTS.

No matter how good your lamp or how perfect your generator, *it's the burner that makes the light.*

The Bray Burners

are guaranteed to give 25% more light from a given amount of acetylene than any other burner ever made. This means less carbide expense and less attention for your generator.

The shape of the flame conforms to the curve of the reflector, and every ray of light is utilized.

With the exception of the small gas tips, Bray Burners are made entirely of heavy brass and are not broken by excessive jarring.

Bray Burners do not flicker and flare, endangering the reflector or lens. They burn steadily whether you be driving over rough roads or asphalt.

Send 40c. for a sample, and compare it with those you are now using. A trial will tell the whole story.

Money back if you are not satisfied.

W. M. CRANE COMPANY

Department N 1131-1133 Broadway, New York, N. Y.

Sole Agents for the U. S. for Geo. Bray & Company. Established in 1885.

If You Want to Buy a Car

State whether you want gasoline, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

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STATISTICS OF THE SHOWS

AMERICAN EXHIBITORS OF CARS

Makers showing gasoline cars	79
Makers showing electric cars	11
Makers showing steam cars	3
Total	93
	13

FOREIGN EXHIBITORS

Makers showing gasoline cars	28
Makers showing electric cars	1

NUMBER OF CARS SHOWN

Gasoline cars	209
Electric cars	39
Steam cars	11
Gasoline business vehicles	29
Electric business vehicles	18
Foreign gasoline cars	64
Foreign electric cars	4
Grand total	374
Motor cycles	12
Tricars	1

STYLES OF BODIES

Side entrance standard bodies	40
Side entrance tulip bodies	27
Side Entrance King of the Belgians body	17
Side entrance convex bodies	5
Victoria runabouts	1
Runabouts	37
Swivel seat bodies	7
Sliding seat bodies	1
Tilting seat bodies	3
Limousine Landaulets	4
Demi Limousines	5
Limousines	44
Coupe Limousine bodies	4
Detachable bodies	2
Coupes	6
Stanhopes	6
Four passenger Stanhopes	1
Broughams	6
Double Victorias	1
Victorias	6
French Victorias	1
Station wagons	3
Theatre busses	1
Doctors' wagons	1
Observation cars	1
Coupe Landaulet	1
Landaulets	15
Landaulets extension	1
Cabs	2
Hansoms	1
Surreys	2
Buckboards	1
Racing cars	2
Victoria tops	11
Canopy tops	6
Cape cart tops, single	2
Four and five bow extension tops	46
Folding tops	2
Folding tops, glass	1
Convertible Runabout	1
Triple Phaetons	2
Victoria Phaeton	1

IGNITION

Makers	Using
Dry batteries	41
Storage cells or accumulators	52
High tension magneto	17
Low tension magneto	16
Both magneto and battery, high tension	10
Both magneto and battery, low tension	7
Make-and-break spark	22
Jnmp spark	89

TRANSMISSIONS

Makers	Using
Sliding gears	89
Planetary systems	18
Special individual clutch	5
Friction drive	6

CLUTCHES

Makers	Using
Cone	64
Multiple disk	29
Friction disk	2
Band	2
Air	1
Floating ring	1

DRIVES

Makers	Using
Shaft drive, bevel gear	64
Special drive, roller gear	1
Single chain drive	16
Double chain drive	52

WATER-COOLING SYSTEMS

Makers	Using
Pumps	92
Thermo-siphon	8
Fin radiators	16
Honeycomb radiators	62
Planetic radiators	1
Tubular, with fins	13
Coil	5
Single fans	88
Double fans	9
No fans	13

MOTORS

Makers	Using
Air cooled	16
Water cooled	92
Air cooled with casing	1
Six cylinder vertical	7
Five cylinder revolving	1
Four cylinder vertical	100
Four cylinder inclined	1
Three cylinder vertical	1
Three cylinder inclined	2
Two cylinder vertical	5
Two cylinder horizontal-opposed	21
Single cylinder horizontal	5
Single cylinder vertical	1
Two-cycle	2
Compound	1

FRAMES

Makers	Using
Pressed steel	89
Pressed steel, one piece	2
Angle steel	10
Tubular steel	1
Laminated wood	2
Wood reinforced	13
Plain wood	2





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Ball-Bearing Statistics of the Shows

CARS USING BALL BEARINGS

+Rochet-Schneider—Transmission and wheels.
+Clement-Bayard—All over excepting motor.
—Cadillac—All over.
—Columbus Buggy Co.
+Decauville—All over.
+De Dietrich—All over.
√Columbia Electric and Gasoline cars—End thrust.
√Elmore—All over.
—Franklin—Transmission, rear axle, steering knuckle.
+Gallia—All over.
+Fiat—All over but motor.
—Knox—All over.
√Locomobile—Thrust bearing, clutch, jack shaft bearings.
—Matheson—All over.
√Northern—Drive.
—Packard—All over but front wheels and motor.
√Peerless—All over.
√Pope-Waverley—
—Royal—Transmission, steering gear, clutch and thrust bearing.
+Mercedes—All over.
+Panhard—Wheels and transmission.
+Renault—Front wheels and differential.
—Stearns—Transmission and wheels.
—Stevens-Duryea—Front wheels, motor of six-cylinder car, transmission, axles.
√Studebaker—
—Thomas—Transmission and wheels.
—Walter—Front and rear wheels, gear case, crank shaft.
Apperson Bros.—Steering gears.
Orient—All but transmission and rear axle.
Pope-Hartford—Wheels.
Pope-Toledo—All but motor.
Darracq—Transmission and axles.
Buick—Transmission on 2 and 4-cylinder cars.
Simplex—Wheels, transmission, and clutch.
C. G. V.—All over.
Winton—Steering thrust collars.
Franklin Commercial Car.—Rear axle.
√Acme—All over.
+Peugeot—All over.
—Berkshire—All over.
—Baker—
√Chadwick—Shafts, transmission.
Leon Bollee—All over.
—American Mercedes—
√Duryea—Front wheels.
√Compound—All over.
+Brazier—
—Fraver-Miller—All over.
—Lozier—All over.
√Marion—Wheels.
Mors—All over but motor.
Napier—Wheels.
+Hotchkiss—All over.
+English Daimler—
+Delaunay-Belleville—All over.
+Martini—All over but motor.
—Premier—Axles and transmission.
√Pungs-Finch—Transmission and front and rear axles.
—Wayne—All over but motor.
—Welch—All over.
+Westinghouse—All over but motor.
Queen—All over.
Züst—All over.
Spyker—All over.
Windsor—Wheels.
Dolson—Transmission.
Detroit—All over.
Aerocar—All over but motor.
Aster—All over.
Ariel—All over.
Viquoet—All over.
Logan—Motor and front wheels.
Crawford—Transmission.
Ford—Front wheels.
White—All over.
Cleveland—All over.
Grout—Wheels.
Moon—All over but motor.
Moline—Front wheels.
Rambler—Front wheels.
Rainier—All over.
National—All over.
Maxwell—Front wheels.
Mitchell—Front and rear axles.
Stoddard—Clutch.

In this list all of those that are marked with a dash (—) are American cars using a fair quantity of Hess-Bright bearings, some of them being mounted on them throughout from the crankshaft down to the hubs, some of them only as regards transmission or the differential and rear axle, the gear case or the hubs, and in all sorts of combinations of these various parts. Those marked with a check mark (√) have only a few of the bearings on a car or do not use them on their complete line. Those marked with a plus mark (+) are European cars using the bearings largely.

A résumé of the entire exhibits in Madison Square Garden shows that of 32 American cars exhibited, 14 or 44% used H. B. bearings largely, and 7 or 22% used them sparingly, a total of 66% of the American exhibitors using the bearings.

Of the European makers out of the total of 10, 9 used the bearings largely, and one not at all, making a total of 90% of the European exhibitors.

Of the total of all 42 cars, American and European, exhibited, 72% used H. B. bearings.

As to the Armory Show, of the total of 65 American exhibitors, 17 or 26% used H. B. bearings largely, and 8 or 12% sparingly.

Of the total of European exhibitors, 17 or 95% used H. B. bearings largely, and one or 5% sparingly.

Out of a total of 84 exhibitors at the Armory, 51% employed H. B. bearings.

Combining the two exhibits, of the American cars, 32% used H. B. bearings largely, and 15% sparingly, or a total of 47%.

Of the European exhibits, 90% used H. B. bearings largely, and 3% sparingly, or a total of 93%.

Considering the entire number of cars exhibited at both shows, 45% used H. B. bearings largely, and 13% sparingly, or a total of 58%.

A consideration of these figures shows that the Europeans have practically adopted these bearings as the standard with so few exceptions, which are distributed over all sorts and kinds of all other bearings, ranging from plain to roller and other types of ball bearings, as to make the remnant only more forcibly testify to the popularity of the D. W. F. or H. B. bearings. As this popularity has been a matter of constant growth since some seven or eight years ago, when the first bearings were brought out, it is clear that it is based on satisfactory results from the users' point of view.

The number alone of the American users also shows that on this side the same result is now being reached, only at a somewhat higher rate of progress, since the favorable European experience undoubtedly has its influence. A study of the firms that are making use of these bearings here will show a situation even more favorable. Nevertheless the mere fact that 47% of all the American cars represented at both the shows used these bearings carries its own tale.

Of the 1905 American cars, a few tried the bearings out, such as, for instance, the Cadillac and the Packard, by employing only one or two bearings on their car. As the result of that experience, both of these firms have carried their use through practically every part of their mechanism. The Cadillac from the motor shaft through the entire mechanism into the axles, and the Packard from the change gear through the rear bridge to the rear hub.

CARS USING ROLLER BEARINGS.

Ford—Rear wheels, axle, and differential.
Grout—Transmission.
Lane—All over.
Buckeye—All over.
Moline—Rear axle and shaft drive.
St. Louis—All over.
Atlas—All over.
Glide—All over.
Rambler—Rear axle and crank shaft.
Maxwell—Rear axle and rear wheels.
Mitchell—Rear axle.
Stoddard—All over.
Jackson—All over.
Premier—Rear axle.
Reo—All wheels.
Windsor—Transmission.
Dorris—All over.
Carey—All wheels.
Logan—Rear wheels.
Iroquois—All over.
Hartford—Both axles.
Rapid—All over.
Dolson—Rear axle and wheels.
Haynes—Motor, rear axle, transmission, drive shaft, and front wheels.
Knox—All over.
Winton—Front and rear axles.
Franklin—Front wheels and front axle.
Royal—Rear and front axles.
Cadillac—Rear axle.
Matheson—Wheels.
Hewitt—Wheels.
Locomobile—Business vehicles.
Knox Commercial Wagons—Wheels and jack shafts.
Thomas—Main shaft and transmission.
Apperson Bros.—Transmission and running gear.
Orient—Axle.
Northern—Wheels.
Pope-Hartford—Direct drive.
Elmore—All over.
Oldsmobile—All over.
Columbia—Wheels, rear axle, and front wheels of small car.
Packard—Front wheels.
Autocar—All over but motor.

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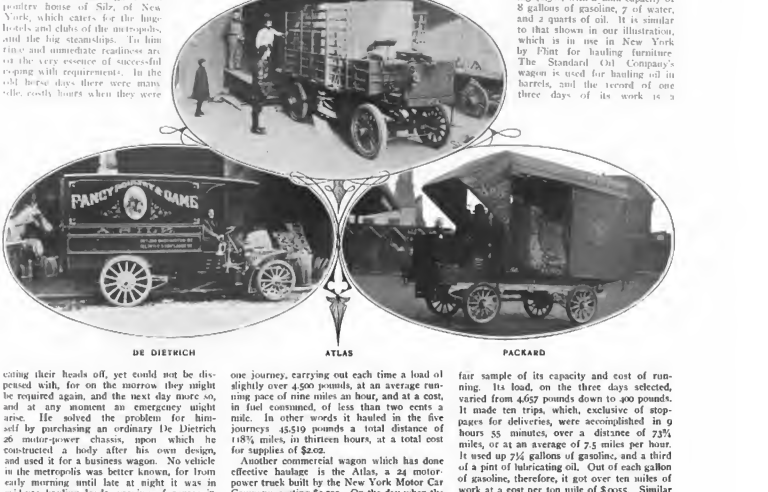
Motor Business Wagons

HEAVY GASOLINES

NOT swiftly, but surely, business motor-wagons propelled by gasoline are making their way into every corner of the United States "where merchants most do congregate." They have not yet been constructed to haul loads as heavy as those propelled by electricity, but they are approaching that stage. Machines capable of hauling a load of from 6,000 to 7,000 pounds are now on the market, and those of even greater capacity are under consideration, if not construction.

In some businesses the gasoline's speed capacity gives it a strong vantage ground. Notably is this the case where the volume of trade varies with the day of the week, or the season of the year, and yet is liable to sudden unforeseen demands, which must be met almost at the moment the orders are received. There are many such in all big cities. Only one need be mentioned, and that is the wholesale game and poultry house of Silz, of New York, which caters for the huge hotels and clubs of the metropolis, and the big steamships. To him time and immediate readiness are of the very essence of success in coping with requirements. In the old horse days there were many idle, costly hours when they were 6,000 pounds ten miles an hour. Its story, as here related, however, is based upon what it actually did, on three recent days within the writer's knowledge, for the National Lead Company of Brooklyn, whose requirements are entirely different from those of Mr. Silz. There is never any variation in the route to be taken, or any difference in the service required; day in and day out there is a set quantity of work to be done, at set times. On each of two out of the three days mentioned, the wagon took two complete journeys back and forth from the company's works at Brooklyn, across the city of New York and Jersey City, to their works at Bergen Point, N. J., and on the other day

TYPICAL COMMERCIAL MOTOR-CARS OF THE GASOLINE TYPE



DE DIETRICH ATLAS PACKARD

sumed but nine gallons of gasoline, and three quarts of oil. The next day, at 7 a.m., it took three tons to New Rochelle, and was back, 41 miles, at 11.45. In the afternoon it left at 3.24 for Mount Vernon, with a similar load, and was back, 33 miles, at 5.05 p.m., using, in the 74 miles, 14 gallons of gasoline and one gallon of oil.

The Packard business wagons are widely used, and it must suffice to give the results of one of the Packards, purchased by that most famous and economically conducted company, the Standard Oil Company, for it may be taken for granted that if that corporation's exacting requirements are satisfied then the gasoline motor business wagon is an inexpensive method of haulage. The truck which they selected for use in Chicago is the well-known Packard, one and a half tons, two-cylinder, 14 motor power, costing $2,500, with a tank capacity of 8 gallons of gasoline, 7 of water, and 2 quarts of oil. It is similar to that shown in our illustration, which is in use in New York by Flint for hauling furniture. The Standard Oil Company's wagon is used for hauling oil in barrels, and the record of one three days of its work is a

eating their heads off, yet could not be dispensed with, for on the morrow they might be required again, and the next day more so, and at any moment an emergency might arise. He solved the problem for himself by purchasing an ordinary De Dietrich 26 motor-power chassis, upon which he constructed a body after his own design, and used it for a business wagon. No vehicle in the metropolis was better known, for from early morning until late at night it was in evidence hauling loads, varying of course in bulk, but often as much as 4,700 pounds; in and out and round about the city, often at the rate of fifteen miles an hour, and at a cost for fuel and oil which did not exceed two cents a mile. How long that particular car would have continued its successful and economical career, without serious expense for repairs, will, unfortunately, never be known, for the day after this writer accompanied it on one of its speedy journeys, and the photograph of it was taken, it was destroyed in a fire, of which it was not the originator.

The same may be said of the less expensive and lower powered Knox truck, costing $3,700, and of 16-20 motor-power. It is capable, according to its builders, of propelling 5,000 to one journey, carrying out each time a load of slightly over 4,500 pounds, at an average running pace of nine miles an hour, and at a cost, in fuel consumed, of less than two cents a mile. In other words it hauled in the five journeys 45,519 pounds a total distance of 118¾ miles, in thirteen hours, at a total cost for supplies of $2.02.

Another commercial wagon which has done effective haulage is the Atlas, a 24 motor-power truck built by the New York Motor Car Company, costing $2,500. On the day when the photograph shown was taken it was hauling packed pianos from the factory to the steamboat docks through crowded, narrow streets, with an expedition of which no horse-drawn vehicle is capable.

During two days of another occasion this same type of vehicle was hauling flour over normal roads, and under usual running conditions when numerous enlightening details were taken. On the first day it left New York city at 7.15 a.m. with three tons of flour, took it to Sheepshead Bay, and was back at 12.30. In the afternoon, it left at 2 o'clock, with three tons more, took it to Newark, returning after delays at the drawbridge, at 6 p.m.—in all 54 miles for the day, in covering which it consumed 9 gallons of gasoline and 1 gallon of oil.

The second day, at 7.30 a.m., it left with three tons of flour for Newark, and returned at 12.30, using 7 gallons of gasoline and 1 gallon of oil. In the afternoon it left at 2.30 for Jersey City, and returned at 6 p.m., using 7 gallons of gasoline and 1 gallon of oil. The total for the two days was 108 miles, 30 gallons of gasoline and 4 gallons of oil.

fair sample of its capacity and cost of running. Its load, on the three days selected, varied from 4,657 pounds down to 400 pounds. It made ten trips, which, exclusive of stoppages for deliveries, were accomplished in 9 hours 55 minutes, over a distance of 73¾ miles, or at an average of 7.5 miles per hour. It used up 7¼ gallons of gasoline, and a third of a pint of lubricating oil. Out of each gallon of gasoline, therefore, it got over ten miles of work at a cost per ton mile of $.0055. Similar results are reported by the Parnlee Transfer Company, of Chicago, in whose service, in one month, a similar Packard wagon traveled about the city and its suburbs, 1,546½ miles, at an average speed of 9¾ miles per hour, with loads averaging over 4,000 pounds, at a cost for the entire month, during which it was at work every day, for gasoline and oil, of $19.23, or 64 1-10 cents a day.

Such records as these could be multiplied in many directions. The Oldsmobile business motor-wagon, in use by the Joseph Horne Company, of Pittsburg, Pa., went into commission, July 11, and worked as per the following schedule, up to the first of October, and is still working:

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THE CONNECTING LINK
Between Home and Office.



ISN'T it significant that most men who can afford more than one motor car own a Pope-Waverley Electric? The reason is simple. Without cranking, oiling, or soiling the gloves it starts right off in any weather. No water to freeze up, always ready, simple and safe. It is in a class by itself—an ideal about-town carriage for the trip to and from the office, the theatre, the shopping tour, calling, or the spin to the suburbs or the country club.

Model 26-C. Price, $1,600, shown in illustration is one of fifteen distinct models made by us at prices ranging from $850 to $2,250.



We make Runabouts, Surreys, Stanhopes, Chelseas, Physicians' Road, Station and Delivery Wagons. Also Trucks on specifications. Write for our complete catalog.

Be sure the name "POPE" is on your Automobile.

Pope Motor Car Company,
Indianapolis, Ind.

BOSTON, MASS., - 223 Columbus Ave.
NEW YORK CITY, N. Y., - 1733 Broadway.
WASHINGTON, D.C., - 405-10th St. N.W.
SAN FRANCISCO, CAL., - 451 Mission St.

CHAUFFEURS CAN BEST FIND
A POSITION BY USING THE

Chauffeurs' Registration Bureau

1789 BROADWAY

SEND STAMPS FOR PARTICULARS

lowing schedule, up to the first of October, and is still working:

1905	Repairs and Overhauling	Mach. oil	Cyl. oil	Gaso-line	Total
	Material Labor	6¢	6¢	6¢	
		116 gal.	176 gal.	105 gal.	
July	$0.55 $7.00	$0.22	$0.72	$1.87 =	$20.56
Aug.	3.05 2.75	.22	.92	14.49 =	21.43
Sept.	3.92 4.62	.22	1.16	17.22 =	27.14
	$7.52 $14.37	$0.66	$3.00	$43.58	$69.13
	Packages delivered		Miles run		Trips made
July	2,778		363		33
August	2,270		715		47
Sept.	3,156		633		50
	8,204		1,811		130
	Average cost per package		Average cost per mile		Average cost per trip
July	$0.0074		$0.044		$0.6230
Aug.	0.0094½		0.030		0.4560
Sept.	0.0086		0.043		0.5430

It will be noticed that in August the machine covered more miles than in September or in July, yet delivered less packages. The reason was that in that month it was sent mostly to the farthest outlying routes, which are not so heavy in packages as in mileage. It covered there, the most hilly routes, with success, taking all grades.

The cost of repairs is not so easily arrived at, but some interesting facts have come from the Auto Express Company, of Detroit, which company has three Oldsmobiles in commission. The first car was received on April 1 last, the second on May 15, and the third on August 1. The cost of maintenance and repairs of the three cars during the respective periods of their use, up to September 9, was:

4 feet water hose	$ .76
1 Master link, Whitney chain	.20
4½ feet water hose	.86
1 Jackson spark plug	2.00
46 hours' labor	13.80
80 dry cells	14.40
1 front side spring	Free
1 new cooler	Free
1 pump shaft	Free
55 hours' labor	$16.50

Part of the charge for labor was for straightening one of the rear axles which was bent through the carelessness of the driver, and this was the only occasion any one of the cars missed a trip.

There is only one danger ahead of the motor-wagon of whatever motive power, and that is the incompetent driver. Over and over again in these investigations a want of recognition of this fact is noticeable; firms which will not entrust, indeed must not, their stationery engines except to certified engineers, and frequently two or three, will contemplate placing the motor-car in the hands of the first raw boy who says he "knows everything about it."

MOTOR BUSINESS WAGONS AT THE SHOWS.

WITH giant strides in seven league boots, the American motor builder is making up for lost time in the exhibition of wagons and trucks for business haulage. Four years ago, although two or three firms had begun the manufacture of them, they made no effort to impress them on the public. It was rather as though they had made their examples for some customer, to his order, than that they had any interest in the general public's requirements.

The trade has evidently woke up to the fact that in the making of cars for commercial purposes there is much present profit, and an illimitable market; whereof France is an example which we are on the way to bettering. In 1899 they made, in the whole of that country, but 234 business cars, and their output amounted in five years to 4,588. We shall outdo that record, though we are, practically, only as yet on the fringe of the effort.

The exhibition at the New York shows January 13-20, 1906, was a revelation of the

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MOON 1906

The Best that Brains and Experience Can Build or Money Can Buy

DESCRIPTION

MOTOR—Special "Rutenber" 30-35 h. p., four cylinder, vertical. Mounted on sub-frame.
TRANSMISSION—Sliding gear type, three speeds forward and one reverse. Direct drive on high gear.
CLUTCH—Latest improved multiple disc.
LUBRICATION—Hill's Precision Oiler. Sight feed.
IGNITION—Jump spark. "Witherbee" storage batteries and "Splitdorff" coil.
FRAME—Cold pressed steel. Drop forged spring hangers.
DRIVE—Bevel gear.
RADIATOR—Improved honey-comb pattern, with fan.
SPRINGS—Highest quality, 40-inch front and 50-inch rear.
AXLES—Reinforced seamless steel tubing; ¾ inch ball bearings.
WHEELS—Wood, artillery pattern, 34-inch front and rear.
TIRES—4-inch Standard clincher, or detachable side flange.
WHEEL BASE—106 inches. Tread, standard, 56 inches.
SPEED—3 to 50 miles per hour.
WEIGHT—About 2,400 lbs.



PRICE=$3,000 f. o. b. factory

SEE US AT THE AUTOMOBILE SHOW
ARMORY SPACE 48, CHICAGO

MOON MOTOR CAR CO.
ST. LOUIS, MO.

Members American Motor Car Manufacturers' Association, Chicago

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To try an Acme is to buy an Acme

Acme Motor Cars

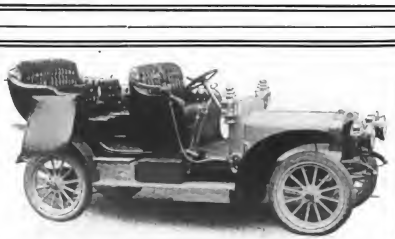
prove on actual practical road demonstration every essential feature of advanced and perfected automobile engineering to-day.

The Acme claims of superiority are based on these cardinal points:

Highest Efficiency — **Highest Power in Proportion to Weight**
Ease of Control — **Strength and Compactness**
Smooth, Quiet Running — **Beauty of Design**

GUARANTEED FOR 365 DAYS

*Acme Motor Cars are built entirely and wholly by the Acme Motor Car Company, which means there are no bought parts for assembling—*NO UNKNOWN QUANTITIES.



1906 ACME CARS
SPECIFICATIONS—TYPE XV

Price	$3500. Complete with two Side Oil Lights, two Acetylene Head Lights and Generator, Tail Light and Horn.	Leather	Best Quality, Hand Buffed, Pebble Grained, French Finished.
Type	Touring Car.	Frame	Cold Rolled Nickel Steel, 180,000 lbs. tensile strength.
Seating Capacity	7 persons.	Axles	Front Nickel Steel, drop forged "I" Beam, Spring, Seats integral with Axle; rear 1¾-in. square, Nickel Steel forged.
Weight	2500 lbs.	Clutch	Multiple Disc, running in oil, self-contained, no end thrust on bearings.
Wheel Base	114 inches.	Transmission	Practically indestructible, Selective Sliding Gear, direct drive on 3rd speed.
Tread	56 inches.	Speeds	4 speeds forward and one reverse on one lever.
Clearance	10 inches.	Gears	Chrome Nickel Steel, oil tempered 212,000 lbs. tensile strength.
Body	Double Side Entrance Tonneau, divided front Seats, made of best seasoned Ash, Poplar and Basswood.	Bearings	Annular Ball, full type, non-adjusting, Lemoine pattern.
Seats	Soft Edged, Spring, Cushioned Seats and Backs; width, front, 19 in., depth, 18 in., width, rear, 52 in., depth, 18 in.	Spring	Internal Rachet in Sprocket of each wheel.
		Bolts and Nuts	All Bolts and Nuts throughout car, case hardened, and locked with Spring Lock Washers and Cotter Pins.
		Gearing	Speed of Engine, 1000 R.P.M., 20-32 T. Sprockets.

Speed	Gear Ratio.	Miles Per Hour.
3rd DIRECT DRIVE	3.88	33.1
2nd	5.22	19.4
1st	9.08	10.1
Reverse	12.64	8.0

TYPE XIV $2,750

Of the same practical construction as type XV. Greatly improved in arrangement and larger body than last year.

Demonstration of Type XV or Type XIV by appointment

ACME MOTOR CAR CO., Reading, Pa.

PHILADELPHIA BRANCH: 1335 ARCH STREET

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ARDSLEY



QUIET, POWERFUL CAR

Guaranteed—a Horse-power for Every 75 Pounds Weight

35-40 H. P. : : Seats 5 Persons

Price, $3,500

SEND FOR CATALOGUE

ARDSLEY MOTOR CAR CO., YONKERS, N. Y.

Members of American Motor Car Manufacturers Ass'n. Salesrooms, BROADWAY & 50th ST.

MODERN COMMERCIAL CARS

Built for Business and Pleasure

Trucks, Delivery Wagons, Omnibuses and Sight-Seeing Cars

GASOLINE *and* ELECTRIC



This is our 16 Passenger 4 cylinder Gasoline Wagonette or Opera Bus. 35 H. P. Sliding Gear Transmission, Double Chain Drive. Upholstered in Genuine Leather. The most handsomely finished and most luxuriant car on the market.

PRICE COMPLETE, $3 500

☞ This is the car that attracted so much favorable attention at the Automobile Club Show at the Armory in New York. Send for Specifications and Prices of other sizes and designs.

The **Auto-Car Equipment Co., Mfrs.**

BUFFALO, N. Y.

For advertisements in this section see page xxx

fact to thousands of business men gathered from all parts of the country for there in the basements of both shows, occupying but a fragment of space, was a haulage capacity representing what would, under the old horse-drawn system, have required acres of space for stables, yards, feed stores, harness rooms and a squadron of laborers to attend to them, and not a soul but salesmen was present. Here was demonstrated beyond peradventure the facts that the motor, whether electric or gasoline, for the heaviest kind of work, requires diminished space for its storage, fewer attendants, and costs nothing when not at work. To say nothing of the self-evident fact that it is ready at a moment's notice, delivers quicker, and by its capacity to cover space



VEHICLE EQUIPMENT CO.

untiringly, extends the radius of the area in which it is possible for a firm profitably to conduct a more extended business.

A better instance of its adaptability in emergencies cannot be given than an incident which occurred with the "Knox Waterless" exhibit at the Madison Square show. That firm's manufactory is at Springfield, Mass., one hundred and sixty miles from New York, and, as usual, their sixteen cars of various sorts were late in being got ready; so late in fact that, on consultation with the railroad authorities, it was discovered that there was no chance of delivery by rail in time to participate in the opening of the show. The firm took the bull by the horns, and, at the risk of presenting their exhibit with marks of wear and tear upon them, they packed their eight "pleasure cars" inside of their eight "business haulers" and started them off to New York. The mid winter roads were covered with snow on some



LOGAN DELIVERY WAGON.

parts and slush and thaw and mud on others—yet they landed their precious cargoes well in front of the show's opening, beating the railroad possibilities by twelve hours, thus proving what they preach.

The assembled exhibits at the New York shows comprised every kind of business motor, with the exception of the great Leviathans, built on the Fischer system, with which everybody in the great cities is familiar, where they are used as "observation cars" to carry the regular daily crowd of trippers and excursionists.

This was an omission of no moment, for what they fulfill is abnormal, and not of general commercial interest. All the rest were there, from the heaviest electrical truck, such as is in daily use by the brewers, whose necessities are typical of many trades, to the lighter runabouts with parcels from the dry goods bargain counters.

The Vehicle Equipment Company had a specimen there of the class of wagon of which

STEVENS-DURYEA TOURING CAR

IF you are looking for the "best" car you can't recognize the car marks by size, speed, price, quietness, number of cylinders, where they are located, whether the car is gear driven or chain, or any such externals. THE car that is "best" for you is **that car which will return you the most fun and enjoyment per dollar expended,** and which will **fill your mind with the greatest number of pleasant recollections and the fewest unpleasant.** YOU can't determine which car that is by listening to what the makers and sellers of the various cars have to say in its favor at **the beginning of the year,** but what those who have purchased it have to say for or against it at the **end of the year.**



WE HAVE ISSUED A BOOK WHICH GIVES A COMPLETE ANALYTICAL DESCRIPTION OF OUR METHOD OF CONSTRUCTION. IT CAN BE HAD UPON REQUEST FROM US OR ANY OF OUR AGENTS

J. STEVENS ARMS & TOOL CO.
712 MAIN ST.,
Chicopee Falls, Mass., U. S. A.
Members Association Licensed Automobile Manufacturers

AUSTIN

EXCLUSIVE AUSTIN FEATURES:

¶New complete double ignition system, improved (patented) sliding gear transmission (selective type) four forward speeds with new (patented) method of operation, new (patented) spring controller absorbing recoil. ¶A beautiful and exceptionally well built car, strong in every part. ¶Write for full particulars.



60 H. P. 1906 MODEL

Austin Automobile Co.
GRAND RAPIDS, MICH.

New York Agent. . . . F. A. SANFORD
1845 Broadway, New York

MOTOR.

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JACKSON



THE JACKSON

Most Magnificent Mobile made for the Money

LOOK at the 1906 models at the Chicago Automobile Show, Coliseum, Chicago, February 3-10. Observe their range—in speed, in power, and in price. Note their style, superb finish and many strong individual features, their up-to-dateness in every respect. And reflect that in 1905 a new (circular track) five mile world's record for two-cylinder cars (6:18 1-5) was established by a strictly stock Jackson car that had been previously driven over 4,000 miles on the road, besides winning more than a barrel of trophies in competitive races.

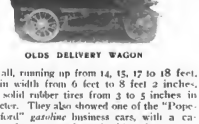
We don't pretend to build racing cars, you know, but went into a few events "just for fun"—and everything came our way!

Chicago Agency, HEAGMAN & HAMMERLY, Cor. Oakley and Harrison Sts.

JACKSON AUTOMOBILE COMPANY
JACKSON, MICHIGAN

they have supplied James A. Hearn seventeen within the year, and Arnold, Constable & Co. eleven, as well as of the three-ton truck, such as they have supplied to H. B. Claflin & Co., the Lambeck & Betz Brewing Co., and others, and of the five-ton trucks used by the Lang Co. for flour haulage, by the Budweiser Co., and the Anheuser-Busch Brewing Association, all solid made, strong low framed, solid tired trucks.

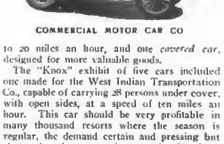
The Pope Motor Car Co. showed their "Waverley" electric in the one, two, three, and four-ton varieties, with varying lengths



OLDS DELIVERY WAGON

over all, running up from 14, 15, 17 to 18 feet, and in width from 6 feet to 8 feet 2 inches, with solid rubber tires from 3 to 5 inches in diameter. They also showed one of the "Pope-Hartford" *gasoline* business cars, with a capacity of 4,000 pounds, and with a floor space equal to 68 square feet.

The Oldsmobile exhibited three of their four models, one only as a chassis, one standard "delivery car," covered top and wired sides, with a capacity of 2,000 pounds and a pace up



COMMERCIAL MOTOR CAR CO

to 20 miles an hour, and one *covered car*, designed for more valuable goods.

The "Knox" exhibit of five cars included one made for the West Indian Transportation Co., capable of carrying 28 persons under cover, with open sides, at a speed of ten miles an hour. This car should be very profitable in many thousand resorts where the season is regular, the demand certain and pressing but short; for the money it earns in the three months of its daily season's use is not dissipated by the maintenance of horse and attendant hire and stabling for the remainder of the year.

The Rapid Motor Vehicle Co., of Pontiac, Mich., displayed one of their well-known commercial wagons, which they are guaranteeing for one year, up to a capacity of 2,000 pounds, for $1,400, and to 3,000 pounds for $1,800.

The Electric Vehicle Co.'s "Columbia" had

Columbia
Gasoline and Electric
AUTOMOBILES

PARDEE-ULLMANN CO.
DEALERS IN HIGH GRADE
MOTOR CARS
1218-20 Michigan Ave., Chicago
PHONE, SOUTH 357
PACKARD FRANKLIN

WOLVERINE
Two-Cycle
Wolverine Automobile & Commercial Vehicle Co.
Dept E Dundee, Mich.

THE FAMOUS ITALIAN AUTOMOBILE
ZÜST
Simplest, Strongest, Fastest,
on exhibition at our private garage, 124 E. 19th St
R. BERTELLI & CO.
Phone 1081 Gram.

DELAUNAY BELLEVILLE
AUTOMOBILE

Acme of Perfection
American made car of Foreign design.
FIVE MODELS
$800.00 to $2,750.00
DEVLIN & CO., WESTERN DISTRIBUTORS
1407 MICHIGAN AVE., CHICAGO
Phone, South 924

WATERLESS KNOX
Pleasure and Commercial Cars
GEO. A. CRANE, Manager
KNOX AUTO-COMPANY, 1200 Michigan Ave., Chicago
'Phone, South 1189

THE MARION
Simplest and strongest construction. Easiest to understand. Easiest to operate.
Marion Motor Car Company
Indianapolis, Ind.

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RAUCH & LANG ELECTRIC

THE SUCCESSFUL "LONG CHARGE" 1906 VEHICLE

STANHOPES
SURREYS
COUPES
DEPOT
WAGONS



1906 Stanhope, $1,800

This machine is guaranteed to make 75 to 85 miles on one charge. Five speeds forward and reverse, geared up to 19 miles per hour. This large mileage is not due to "freak" batteries, but to the general superiority of design and construction throughout.

Write for Catalogue A

The RAUCH & LANG CARRIAGE CO. ESTABLISHED 1853

CLEVELAND, O. Opposite The Belvedere

BAKER ELECTRICS

THE ARISTOCRATS OF MOTORDOM

IMPERIALS
STANHOPES
SURREYS

DEPOT
CARRIAGES
BROUGHAMS



Our depot carriage is the acme of refined, quiet elegance. Its every appointment is correct. Its finish and upholstery are the best that money can buy and the most skillful labor execute *by hand*. Its mechanical construction is as nearly perfect as long experience in the manufacture of electric vehicles enables us to make it.

All BAKER ELECTRICS are extremely light in weight, yet made from such carefully selected materials, with the utmost care and attention to every detail that they are extremely efficient and durable.

The absolute simplicity of operation and ease of control adapt BAKER VEHICLES for the use of anyone and a skilled chauffeur is never necessary.

We desire agents in a few important cities not yet covered and will be pleased to correspond with all who care to arrange for the best and easiest selling line of vehicles in the market.

THE BAKER MOTOR VEHICLE CO. 14 JESSIE STREET, CLEVELAND, O.

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REO

The Car that Did is the Car that Will

No cars ever scored a more telling and remarkable series of real victories than were won in their first short season by REO cars.

They won the National Trophy First Prize gold medal for all cars, in the New York Motor Club's great six-day Economy test. Also the First Prize gold medal for cars costing up to $1,500 (won by the 4-seat REO Runabout). And three other prizes. Five out of a possible seven.

In the first run of this test a REO car carried its load from New York to Philadelphia and return, *nearly 200 miles*, at a total cost (excluding herriage) of 25 cents per passenger.

On Pocowsie Hill, Springfield, Mass., a REO Touring Car (shown above) won the silver cup for cars costing up to $1,500.

On Paddock Hill, Cincinnati, it won three cups in one day; made it of a mile under full load on a 12 to 15 per cent. grade in one minute 46 seconds; and beat all twenty of the four-passenger gasoline cars, including eight of 24 horse-power rating and double the REO'S price.

Out of 58 starters and 42 finishers in the Los Angeles Dealers' Run to Santa Barbara, this car made the only perfect score in its class; and won its class cup by going 230 miles over rough, hilly country, without one instant's delay for repairs or adjustment.

In the famous Glidden Tour, in the great International "Climb to the Clouds" up Mt. Washington and on the Syracuse and Empire City race tracks REO cars broke economy, climbing and racing records, and startled the whole motoring fraternity by leaping at one bound into the front rank of star performers.

But more remarkable than any public performance is the wonderful way in which REO cars stood up continuously to practical work under real conditions, and their almost total freedom from trouble or complaint of any sort in the hands of thousands of inexperienced drivers.

What they have done shows what they will do

Write for the REO book that tells why



Touring Car 16 H.P., 1,600 pounds, 90-inch wheel base, 5 passengers, side door detachable tonneau. Speed 35 miles per hour, $1,250.

Runabout 8 H.P., 900 pounds, 2 passengers, 25 miles per hour, $650. With folding seat to carry two extra passengers, $675.

REO Motor Car Co. R. E. Olds, *Pres.* Sales Department, Lansing, Mich. R. M. Owen, *Sales Mgr.*

Agencies Throughout the United States

The Circulation of Motor

is larger than that of any other motoring publication in the world. By larger we mean not only a larger total print, but also more paid subscribers and more newsstand sales. Our books are always open to our advertisers

four of their business trucks on show, fitted with the "Exide" batteries, with capacities rising from 1,000 to 3,000 pounds, and a specimen of "the chassis" which they supply without bodies, so that the purchaser may have whatever body he wishes adapted to it by his own wagon maker, so long as the carrying capacity does not exceed ten tons.

The Hewitt Motor Co. had four specimens. One with a capacity of three tons and a novel application of two separate solid rubber tires on the hind wheels, leaving a gutter-like space between them, each tire 3½ inches wide. This construction has obtained quite a vogue in Europe.

The McCrea Motor Truck Co., of Owego, N. Y., had a "Champion" type, electric, which they make with a capacity of from 800 pounds to, if need be, ten tons.

The "Crown," Detroit Auto Vehicle Co., also had a specimen of their make, a light delivery car of 1,500 pounds carrying capacity. The Studebakers, of South Bend, Ind., and New York, exhibited five of their well-known electric cars for business delivery.

The Lansden Co., of Newark, sent a specimen of their "Electrette" with a guaranteed speed of 25 miles per hour and capable of covering 50 to 60 miles per charge, a similar machine to those made by the firm for the Adams Express Co.

The H. H. Franklin Mfg. Co., of Syracuse, exhibited their special gasoline type J with 12 Franklin motor power and a speed of 20 miles an hour.

The Commercial Motor Car Co., of New York, showed their three-ton gasoline truck 30 m.p., with long wearing, non-skidding tires put on in sections, making renewals of worn parts inexpensive.

And last, but not least, the well-known business car makers, "Packards" and the "Atlas," were each represented by one characteristic specimen only, for the very good reason that the demand for their trucks, both at home and abroad, has made it impossible for them to reserve more than one meagre sample of their output for exposition, as our French cousins term it.

The Aster Co. exhibited a little service express car with three wheels, very handy for the rapid delivery of small parcels, another handy little car being the Indian Tri-Car fitted with a van attachment.

STEAM VEHICLES AT THE SHOWS.

THE White steamers for 1906 approach as near perfection as anything in the way of a steam motor-car that ever has been produced. The new models are larger than ever, though their weight is not excessive, and the improvements incorporated in the latest cars of the new designs are such as to make them exceedingly simple and reliable in operation, without any impairment of the other good qualities they long have possessed. Foremost among the improvements that are apparent to the casual observer is the new side entrance body, of most graceful lines, which is made possible by the new "down draft" arrangement for disposing of the gases from the burner. Instead of the side flues that formerly constituted a defect in the appearance of this car, there is a double sheet-metal wall around the flash generator, from the bottom of which a wide flat flue extends directly out to the rear of the car, beneath its floor. Another innovation is in the burner, to which all the air is supplied through the mixing nozzle, none being permitted to rise through the bottom of the burner, as has been the common practice heretofore. The advantage of this construction is that it prevents blowing out of the flame, even in the heaviest winds, while at the same time it facilitates control and regulation of the power output.

The Johnson Auto-Carriage is a newcomer

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EXPERTS say that the Top Notch of AUTOMOBILE DEVELOPMENT has been reached in the

Four-Cylinder Waterless KNOX

AUTOMOBILISTS are cordially invited to examine and ride in this car and see for themselves whether or not it excels in strength, speed, comfort, style, ample power under all conditions, and in every detail that goes to make a car high grade and a delight to the user.



Write for pleasure and commercial catalogues

35-40 H. P.

Side entrance tonneau, capacity 7 persons, price - - - $4000.00
Limousine . . . . capacity 6 persons, price - - - $5000.00

KNOX AUTOMOBILE COMPANY, SPRINGFIELD, Mass.

Members A. L. A. M.

Pierce-Racine:

Four Models

MODEL A-3
12 H.P. Twin Cylinder Runabout.
$750.00

MODEL B-2
16 H.P. Twin Cylinder Light Touring Car.
$1150.00

New England Agents
BUTLER MOTOR CAR COMPANY
998 Boylston Street, Boston, Mass.

Cut shows our 14 H.P. Twin Cylinder Light Touring Car

The best in the world for the money.
Send for printed matter.



MODEL A-4
14 H.P. Twin Cylinder Light Touring Car.
$850.00

MODEL C
24 H.P. Four Cylinder Touring Car.
$1750.00

New York Agents
GANTERT & PAUL
60-62 West 116th Street New York City

PIERCE ENGINE COMPANY, 1952 CLARK STREET RACINE, WISCONSIN

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WOODS

Builders of Best Quality Electric and Gasolene Automobiles



Stanhope

We use Nickel Chrome Steel and Hess-Bright Ball Bearings throughout on all our vehicles

More than 600 Woods Electric Autos in constant use in the City of Chicago



Queen Victoria with Leather Tops for Summer Use

A Few More Good Agencies Open

These Tops are Interchangeable



Queen Victoria with Brougham Top for Winter Use

The past twelve months have demonstrated the superiority of our 40 H. P. Gasolene Car

Write for Catalogue and Information



Extension Brougham

See Our Exhibit at Coliseum Chicago

Woods Motor Vehicle Company

Chicago, Ill

WANTED

A MAN WITH A NEED

If you want to buy anything, if you want to sell anything, if you want a Chauffeur or Mecanicien, if you want anything in the world of motoring, you want

MOTOR MESSENGERS

A little "Want Advertisement" or MOTOR MESSENGER in the next issue of MOTOR will give results to fit your needs.

In a few words, write your "want" and mail it to MOTOR with the price of the MOTOR MESSENGER at

5 CENTS A WORD

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and the condenser consists of a great length of finned tubing, ingeniously disposed over the roof. Kerosene is employed as fuel, a new burner of original construction permitting its utilization with a degree of success heretofore unattainable. The body is of very massive appearance—the rear being on the limousine order, and the front affording an unusual degree of protection to the driver.

The new Lane steamer, made by a concern prominent in the manufacture of steam runabouts during the heyday of that vehicle's popularity, is a touring car of regulation build, and bids fair to dispute the supremacy of other cars of its type. Instead of an excess of automatic devices, in this car the intelligence of the operator is depended upon as being more reliable than mechanism. The boiler is a combination flue and flash, with water-glass, safety valve, etc. An automatic boiler feed, controlled by a by-pass and a thermostat, constitutes the one exception to the rule of manually-operated attachments. A condenser, of vertical tubes without fins, is placed in front of the bonnet, and is said to keep water consumption down to a minimum. The engine is a compound, with two cylinders in an inclined position, under the footboard, and driving through the rear axle by a single, long chain.

ELECTRIC VEHICLES AT THE SHOWS.

IN the field of the electric, great progress is manifest, and the cars of this power seen at the shows were well designed and unique in mileage range, simplicity, and reliability.

Lighter weight batteries than ever are the rule, apparently without impairment of other qualities, and an increase in the number of controller speeds makes for even easier operation than that for which the electric is noted.

Particularly interesting are several of the new Baker electrics, with a single motor hung under the bonnet, and driving by propeller shaft and bevel gear to the rear axle, quite in the manner of the gasoline car. The large inside-driven Baker brougham, capable of seating four passengers with complete protection from the weather, excited particular comment because of its novel body outlines.

The Camoun electric fore-carriage was another novelty, it consisting of a complete electric power plant—batteries, controller, etc., carried on a single pair of wheels, and capable of being fitted to any ordinary horse-drawn vehicle in such a manner as to convert it into a very presentable and capable automobile. The Gallia runabout, with a French battery, single motor, and a sixty-mile radius on a charge; and the Lansden runabout, with an equipment of Edison cells, were peculiar vehicles of a type that more will be seen of in the future. The Lansden car is built with a very long, practically flat platform extending forward from the single seat, the batteries being mounted beneath this.

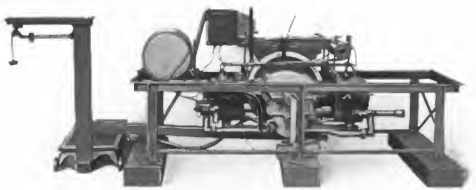
The Woods Victoria and the Pope-Waverley station wagon were good examples of the inside and outside-driven vehicles, respectively, that are coming into use for physicians and those residing in the country.

A general increase in the application of pneumatic tires to electrics is more significant than pages of comment would be on the reduction of weight that is one of the most important, though least apparent features of electric-vehicle development.

Ball bearings of the non-adjustable type are this year fitted to a number of electric vehicles and show the disposition to reduce power losses in a type of car in which fundamental considerations make it imperative that none *should* be wasted.

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That Car of Quality



Testing Logan Engines

Every Logan Engine is tested for actual brake horse-power before it is placed in the chassis for the road test. If it does not develop all the power that we have rated for its type, back it goes to the factory to be readjusted—reconstructed if necessary.

After the shop test the engine is placed in a full weight chassis (not a skeleton) and tested for speed and hill climbing power.

So when you buy a Logan Car you do not pay for the horse-power which an engine of its size and specifications merely *ought* to show, but you get an engine which has actually proven its ability to overcome the most severe conditions it is likely to meet.

This same care is evidenced throughout our factory.

This is the Logan 1906 line:

Runabout	10 H.P.	Air Cooled
Light Touring Car	20 H.P.	Water Cooled
Large Touring Car	30 H.P.	Water Cooled
Light Delivery Car	10 H.P.	Air Cooled
2-Ton Delivery Truck	30 H.P.	Water Cooled
20 Passenger Bus	30 H.P.	Water Cooled

These cars are *not* all built of the same weight frame and the same type of construction, regardless of the size and usage of the car and the load it is intended to carry. Every feature of each car is designed to fulfill the requirements of its particular use.

Besides this adaptability of construction, the Logan Cars embody the following distinctive advantages:

Equalized Spring Trussed Frame which absorbs many jolts and jars which would otherwise go to engine and occupants.

Sliding Gear Transmission in which it is impossible to strip the gears.

Transmission Brake operated by reversing clutch lever.

High Speed Gear controls all speeds from one mile per hour to limit.

Special Fly Wheel Construction which gives one-fifth more power from cylinders of the same bore and stroke.

Simple in operation—two levers and one pedal control all gears, brakes and clutch.

Write for our new Catalog E 2

The Logan Construction Co., Chillicothe, Ohio

America's Most Famous Car

THE ROYAL TOURIST

All parts produced in the greatly enlarged factory of

THE ROYAL MOTOR CAR COMPANY, CLEVELAND, OHIO

ROYAL

40 H. P.—four cylinder—5-inch bore by 5½-inch stroke—bronze bearings throughout engine—commutator easy of access, on top of engine—conical leather faced clutch of large diameter—flat springs placed under leather, makes starting of car progressive—no adjustment ever necessary—sliding gear transmission—high grade bearings throughout—direct drive on high gear—all gears bolted to flanges, so that no dependence is placed on keys or set screws that hold gears in place—universal joints and propeller shaft exceptionally robust, and all wearing parts of same are hardened—entire rear axle equipped with roller bearings—front wheels also run on roller bearings—steering gear is of worm and segment type, and is very easy in its action—pressed steel frame, with drop forged spring hangers—positive feed oiler—fan draws air through entire radiating surface, of cellular type radiator—wheel base 110 inches—gasoline capacity 22 gallons.

The entire car is built from the best materials that money can buy. It is designed by America's leading motor-car engineer. Produced by competent mechanics, on precision machinery.

This is the reason why the car was able to beat the special built racing machines in the Vanderbilt Elimination Trials, after turning a somersault that would have put any other car in the world out of the race. This is also the reason why all of the owners of Royal Tourists are so well satisfied and have such good service from their cars. From all of the data that we have been able to secure, the cost for repairs in running a Royal Tourist averages less than $25.00 each, for an entire season. If you want to know how good a Royal Tourist is ask some of your friends who are fortunate enough to own one.

Model G, $3,500 Forty H. P.

New 1906 Catalogue now ready. Write for it

ROYAL MOTOR CAR COMPANY, CLEVELAND, OHIO

Members Association of Licensed Automobile Manufacturers

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Soules



DELIVERY WAGON

THE ENTERPRISING AGENT who has the foresight to look into the future can see that the substantial end of the automobile business is going to be the commercial vehicle, and will be prepared to build up the commercial end of his business. In order to do this it will be very necessary to handle only the very best commercial vehicle.

The Soules delivery wagon is built for commercial purposes only. It is constructed of high grade material throughout, and the simplicity of construction and operation is such that it has been the marvel of those who have provided themselves with these cars.

The Soules is equipped with a double-opposed motor, 5½ x 5 in. cylinders, located under the hood, sliding gear transmission in unit with engine, every part being readily accessible, and is capable of carrying a load up to 2,000 pounds. It is equipped with or without top, as desired.

We are now booking agencies throughout the country, and we shall be pleased to send full details to any who are interested.

Specifications

PRICE—$1,500.
BODY—Open, with detachable top, or closed with wire side panels.
CAPACITY—2,500 pounds.
FRAME—Angle steel.
BRAKES—Internal and external rear hub.
TIRES—32 x 3, or 34 x 3½.
CYLINDERS—2, horizontal-opposed, in front, 5½ x 5.
COOLING—Water, thermo-siphon system.
IGNITION—Jump spark, double coil.
CLUTCH—Cone, Leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—2,0000 pounds.

SOULES MOTOR CAR COMPANY,
GRAND RAPIDS, MICH.

Sales Department and Show Room, 736 to 740 Woodward Avenue, DETROIT, MICH.

1906 Motor Car Directory

CLOTH BOUND
$1.00 PER COPY

MOTOR, 1789 Broadway, NEW YORK

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ELECTRICAL EQUIPMENT OF A MODERN GARAGE.

WITH the ever increasing use of electricity for motor-car propulsion, there has come a corresponding demand for a simple and convenient method of furnishing direct current for charging the storage batteries. Heretofore, aside from the steam or gasoline direct-current generator set, there have been practically four different methods of accomplishing this, motor generator sets, singe-phase rotary converters, synchronous or mechanically driven rectifiers, and chemical rectifiers. While all these methods have been more or less successful they have each had inherent faults which have tended to make their operation unsatisfactory or inefficient. With these conditions in mind the General Electric Company has developed a mercury arc rectifier charging set, adapted to meet the requirements of motor-car work. This rectifier has found wide use for this purpose on account of its compactness and simplicity as well as its high efficiency over a wide range of voltage requirements. For these reasons it is adapted for both private and public garages.

A noteworthy and interesting example of the latter is to be found in the garage about to be opened by the Cook & Stoddard Company at Washington, D. C. This is by far the largest and most complete example of charging by the mercury arc rectifier that has ever been installed.

The building in which this equipment will be installed has a ground area of about 10,000 square feet, of which approximately one-third will be devoted to electric carriages, the remainder being given over to gasoline machines. Parallel to the side wall of this building will be located five General Electric mercury arc rectifiers, which form the initial installation, occupying the minimum amount of space, and at the same time affording the greatest ease of access.

Each of these five charging units will consist of a forty ampere mercury arc rectifier tube mounted upon a dull black slate panel with the necessary switches, instruments, and fittings grouped centrally below. The combination of terminals is such that from one to ten vehicles can be charged at one time, each vehicle being equipped with from twelve to fourteen cells having a normal maximum charging rate of 20 amperes. Any combination of vehicles having these limiting capacities, may be charged simultaneously. It is this flexibility of arrangement used in varying and measuring the necessary voltage and current for charging purposes which makes this installation unique.

The mercury arc rectifier tube, or transforming device, is mounted in a neat and substantial fitting so arranged that the shaking, necessary to start the tube in operation, can be easily given by the pull-button on the section below. On this lower section of the panel are also mounted the instruments and switches. Three instruments are provided, two voltmeters and one ammeter. One voltmeter, having a 300-volt scale, indicates the total direct current voltage across the direct-current terminals, while the other, a 75-volt instrument, measures the voltage across each set of batteries as they are charging. This is accomplished by means of a dial switch, the points of the switch being numbered to correspond with the charging plug terminals. The ammeter is so arranged that it will indicate the current in either of the two sets of charging terminals or in both, being provided with a flexible connector for this purpose which taps into suitable plug terminals.

These latter as well as the charging plug terminals are mounted on a sub-base, below the switches and instruments, in a position where they will be most accessible for connecting. The charging plug terminals are so constructed that the circuit is not broken on the insertion or withdrawal of the plugs. They are arranged in two series of five each, these two sets of five being connected in multiple across the direct-current terminals of the rectifier tube. It is therefore evident that one

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National

Reliability and Endurance

Were demonstrated in a convincing way on Nov. 16-17th at Indianapolis when a National Stripped Stock Car made

1094 3-16 Miles in 24 Hours



Model D, 4 Cylinder, 35-40 H. P.
$3,000

Breaking the World's Record by 78 9-16 Miles



Model E, 6 Cylinder, 50-60 H. P.
$4,000

WRITE US AT ONCE FOR FULL DETAILS

DISTRIBUTORS: Linscott Motor Co., 165 Columbus Ave., Boston. Ralph Temple Auto Co., 311 Michigan Ave., Chicago. Liberty Auto Company, 138 Beatty St., Pittsburg, Pa. Homan & Schulz Co., 58th St. and Broadway, New York. Tioga Auto Co., Broad and Tioga Sts., Philadelphia, Pa. National Motor Car Agency, Los Angeles, Cal.

NATIONAL MOTOR VEHICLE CO.

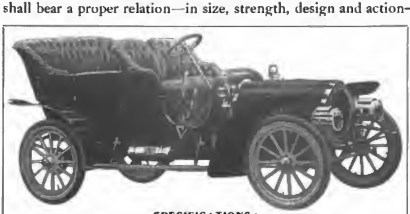
1004 EAST 22d STREET INDIANAPOLIS, IND.

(Member American Motor Car Manufacturers' Association, Chicago)

PREMIER

"The Quality Car" :: :: Air Cooled

Consistency in automobile construction and performance has been our aim; that is, each part of the car shall bear a proper relation—in size, strength, design and action—to all other parts. This painstaking care upon our part produces a car of which may be expected the best results, with almost mathematical regularity, as witness the performance of a 16 H. P. Premier in the races at Indianapolis, Nov. 4th last, to wit: 100 miles in record time for a car of its class, and a variation of less than five seconds between the fastest and slowest miles, the last twenty being the fastest.



SPECIFICATIONS:

20-24 M. P., four cylinder 4¼ x 4½ in. vertical motor, with fan, three speeds forward and reverse Premier sliding gear transmission (mounted on five Annular ball bearings), bevel gear shaft drive, pressed steel frame, I beam front axle, 106 in. wheel base, 32x4 in. G & J clincher tires, full gas and oil lamp equipment and generator, horn, full kits of tire and repair tools and brakes *that hold*. Price, $2250 f. o. b. Indianapolis. On exhibition at the Coliseum Show, Chicago, Spaces 93 and 94.

These results can only be obtained by a combination of correct principles, highest grade of materials and most competent workmen, supplemented by many miles of actual road trial of each car.

The new Model L car is speedy, strong, comfortable, handsome, economical of maintenance, working parts easily accessible, a combination which renders it highly desirable.

Send for our Catalogue and Booklet R

PREMIER MOTOR MANUFACTURING COMPANY

Members American Motor Car Mfrs. Assn. INDIANAPOLIS, INDIANA, U. S. A.

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Motor Messengers Bring Results

One advertiser who used the classified pages of Motor Bureau, in the December issue, has received up to date (December 15th) 173 answers from 35 states and territories. These prove conclusively that a Motor Messenger, announcing a second-hand car for sale at a reasonable price, will bring the desired results. Answers for this same advertiser are still coming, (December 15) and the total number of replies will probably reach 200. Look at the pages of Motor Bureau in this issue—then send in your advertisement.

set of cells, requiring a maximum charging current of twenty amperes, may be plugged in, or any combination of plugs may be used, provided the total charging current does not exceed the maximum load of the rectifier tube.

In this way it will be possible to charge from one to ten, twelve cell carriages at one time, by the simple process of plugging into the terminals and adjusting the voltage by the proper switches which control the alternating current supply. Moreover, as the plug terminals are designed, the operator can connect or disconnect any carriage at any time without breaking the circuit or stopping the charging of the remaining vehicles. The complete equipment of five units will thus permit the Cook & Stoddard Company to charge as many as fifty, twelve-cell electric automobiles at one time. This modern installation was planned and will be furnished by the General Electric Company of Schenectady, N. Y.

NEW BRISCOE PLANT.

THE Briscoe Manufacturing Company have recently acquired the plant of the Wheeler Manufacturing Company, who are moving into their new factory. This plant adjoins the Detroit factory of the Briscoe Company, and is a timely acquisition, as it contains some 15,000 square feet of floor space, which will be needed this year to take care of their increased sales. While their eastern trade has been handled by the new plant of the company at Newark, N. J., the industry as a whole has so expanded that an enlargement of the Detroit plant was deemed necessary. This need and the accompanying risk of delays in deliveries have been promptly met by the acquisition of the neighboring factory and the building of a new fender enameling department. They are thus prepared to meet the increase in business which is flowing in and to maintain their reputation for the prompt filling of orders.

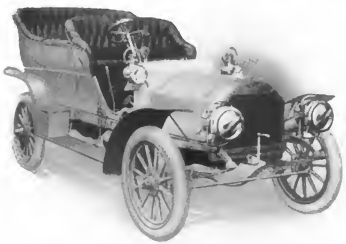
The years of experience which this concern has had in the difficulties peculiar to the working of sheet copper and brass have rendered their workmen very expert. It also explains their success in the production of designs which others have tried to copy, but with indifferent results. They have evolved a cellular construction for radiators which can be readily repaired without sacrificing valuable radiating surface. The elements which are built up into the radiator block allow cross circulation of the cooling water and form a true honeycomb with the highest efficiency as the result. The design provides for a thicker layer of water throughout the honeycomb than is found in foreign radiators of the same type and overcomes the tendency to clog when muddy water is used. A fundamental patent, recently allowed, protects the company in the use of this unique construction and improvements in the method of assembling these cellular radiators enable them to put the price within close range of the tubular style. Comparative tests in the experimental department indicate the cellular cooler as well adapted for the thermo-siphon circulation.

That the Briscoe Manufacturing Company is the pioneer in radiator design is emphasized by the success which followed their introduction of the flat tube. Last year one or more of their flat tube designs were adopted by several of the best known American automobile builders, and the same 1906 cars, as well as many others, will carry Briscoe flat tube radiators. The makers call attention to improvements also in the design of this style.

AMONG the types of new cabs which the London Motor-cab Company are now placing for public hire in London is the "Rational." They are of British construction throughout, and are built by the Heatley-Gresham Engineering Company. Six have already been constructed, and a large number are to follow. The 12-horse-power engine has two horizontal cylinders. There are only two forward speeds, and the power is transmitted direct by a chain to the back axle.

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Again—"as good as it looks."

Stoddard-Dayton

MODEL D TOURING CAR

has more than beauty-lines to recommend it.

But, if you will look at its picture below, you are bound to agree that it is just about the handsomest, trimmest, most luxuriously-inviting vehicle that four wheels ever carried.

Note the exquisite modeling of the body, the clean, symmetrical lines of the frame—the vigorous and altogether stunning effect of the entire car.

Note—you cannot see it in the cut, but in the car itself—the delicate pearl gray of its finish (16 paintings to attain *that* lustre!) See how this quaker garb is relieved by the effective contrast of rich tan upholstering. Other colors optional with purchaser.

And then remember that artistic appearance is the *least* of the STODDARD-DAYTON'S virtues.

It is "as good as it looks." Every STODDARD-DAYTON car *must* perform, and prove its *ability* to perform, before it leaves our factory. This is done by exacting block tests for motor, and road tests for car before final finish is applied.

The STODDARD-DAYTON Model D, 5-passenger Touring Car has a special type of 4 1-2 x 5 in. 4-cylinder motor; water cooled; frame of hot-rolled, high carbon, pressed steel; sliding gear transmission, three speeds and reverse—selective type, can be changed instantly from high to intermediate, or vice versa, at speed of 25 miles, uphill or down, without clashing or friction; practically noiseless; entire transmission on roller bearings; mechanical lubrication; 30-35 horse-power. Proportion of power to weight, one horse power to every sixty pounds. $2,250. Immediate delivery.

Write for our 1906 catalog—it's full of interest to every motorist. Sent FREE on request.

The Dayton Motor Car Co., Dayton, Ohio.

AGENCIES IN THE FOLLOWING CITIES:

McDuffee Automobile Co., 1249 Michigan Avenue, Chicago; Stoddard-Dayton Agency, 1823 Broadway, New York; Hamilton Automobile Co., 306 North Broad Street, Philadelphia; Central Automobile Co., 1089 Centre Avenue, Pittsburg; J. A. Cramer, 737 Main Street, Buffalo; Randall Motor Car Co., 24 Columbus Avenue, Boston; Colonial Automobile Co., 3044 Olive Street, St. Louis; Dwight Automobile Co., Omaha; H. S. Moore, 160 Crawford Road, Cleveland; Automobile and Supply Co., 24 Temperance Street, Toronto; Norman W. Church, Hellman Building, Los Angeles, Cal.; Haynes Automobile Co., 220 South Sixth Street, Minneapolis; C. M. Wood, Denver; Fisher Automobile Co., 130 North Illinois Street, Indianapolis.

40-45 H.P.



2200 Lbs.

The Mercedes has won more laurels for speed and strength than any other automobile in the world. Its type of engine and of construction has been adopted by scores of automobile makers.

The American automobilist who wants a Mercedes, need not endure the excessive duty charged on the imported machine.

You can buy the

American Mercedes

an exact duplicate of the 1906 Mercedes Automobile for

$7500

in New York, just the Paris price.

SAVE THE DUTY

We have sole ownership for the United States and Canada of all patents, designs and shop drawings used by our parent Company, Daimler Motoren Gesellschaft in building the Mercedes. Every part of the foreign and the American car is interchangeable. In weight, power and speed these cars are exactly alike.

DAIMLER MANUFACTURING CO.,

967 Steinway Avenue, LONG ISLAND CITY, N. Y.

NEW YORK CITY GARAGE, 10 WEST 60th STREET.

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The Stearns

Two for One

One Model 45 Horse Power

Two Stearns Cars will cost no more than one foreign car, no better than either Stearns. Purchasing one Stearns Car saves a sum equal to its cost.

Two Stearns Cars cost $8,500. Each duplicates in material any single foreign car costing the same sum (we buy materials all over the world). Each shows better finish and workmanship, for we put more time into the work than any other maker puts into a touring car. Over 2,100 hours of skilled American labor—10 months of work days—on each car. Each shows refinement of standard design without any after-thoughts—a complete demonstration of engineering skill.

☞ By what process could any maker, anywhere, produce a better car? Where is another so made?

After producing this car we figured the cost and selling price. We were pleased to find that the duties and excessive commissions on our only competitors, make our charge—$4,250—barely half the cost of any foreign car that makes a comparison possible.

We seek communication with those who will appreciate this car. For such it will give a service greater than any other mechanism the world has produced. Shall we send our book of details?

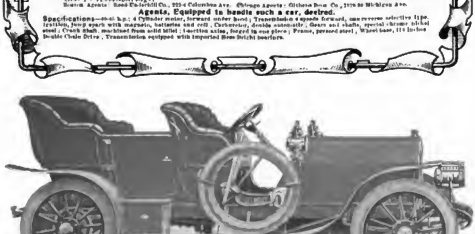
New York Branch
121 WEST 80th STREET

THE F. B. STEARNS CO., *Members A. L. A. M.*
Geo. F. Houlihan, Mgr.
Branch Agents: Knox Automobile Co., 1324 Columbus Ave. Chicago Agents: Hitchens Bros. Co., 1370 to 1380 Michigan Ave.

2070 Euclid Avenue, CLEVELAND, O.

Agents, Equipped to handle such a car, desired.

Specifications—60-65 h.p.; 4 Cylinder motor, forward under hood; Transmission 4 speeds forward, one reverse selective type, involving heavy gears with magnesia, bakelite and cork; Carburetor, double automatic; Gears and shafts, special chrome nickel steel; Crank shaft, machined from solid billet; 1-section axles, forged in one piece; Frame, pressed steel; Wheel base, 112 in.-Iron Double Chain Drive; Transmission equipped with imported Bow Bolt bearings.



If You Want to Buy a Car

¶ State whether you want gasolene, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

¶ Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

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Do's and Don't's.

From a Motorist's Experience Book.

Cleaning Carbon From the Combustion Chamber.—I remarked last month that the motor of my car, after once being scraped, gave evidence of there still being some carbon deposit in the combustion chamber, and not long afterwards it became plain that the trouble had not been wholly cured. Actual pre-ignition did not occur, but there was an increasing tendency for the combustion in one cylinder to take place very rapidly, clearly indicating the presence once more of my familiar enemy. As this phenomenon made it impossible to time the ignition correctly for both cylinders, the power of the motor was materially reduced on hills, and I at once set to work to discover a cure. This I found in an outfit so exceedingly simple that it is a wonder to me that it is not to be found in the tool kit of every owner of a gasoline car. It consists of a 2 c.p. battery lamp screwed into a miniature socket and suitably connected to a length of No. 16 lamp cord, whereby it could be attached temporarily to the battery, and a flat dentist's mirror, of the kind which does not need to be described, except to point out that the concave or magnifying variety will not do. I wound a length of iron wire spirally around the lamp cord for a few inches back from the socket, and extended the spiral to enclose the socket and the lamp itself, thereby forming a rough-and-ready protection to the latter from breakage in the cylinder. With this lamp introduced into the combustion chamber through the inlet valve hole, and using scrapers suitably bent to reach all parts of the combustion chamber, when inserted horizontally through the spark plug hole, I could, by the aid of the mirror, watch every movement of the scrapers, and direct them exactly to the points which required cleaning. Where the carbon came out easily I used no kerosene, but where it was very hard and resisted removal I squirted in a little kerosene and let it stand over night, after which I had no further trouble. The appearance of the spark plugs gave me a clue to the cylinder containing the principal deposit of carbon, and an exploration with the lamp proved this diagnosis to be correct. I found the best way to get rid of the carbon to be to take out the exhaust valve and shovel the accumulation down into the exhaust outlet. Of course, it went into the muffler, and if the car lasted a hundred years the muffler might get choked, but at present I am not concerned over that phase of the matter.

In my exploration I came upon one thing which I had not suspected, viz., a small, sharp ridge of cast iron projecting into the combustion chamber of each cylinder, doubtless through a crack in the core when the cylinders were cast. These sharp edges I found almost perfectly bare of carbon, a fact which may be accounted for either by supposing that the indraft of cool mixture swept them clean (they were in the upper part of the combustion chamber, not far from the inlet valve), or that they got so hot as to burn off the carbon as fast it was deposited. As the motor ran after the second scraping out without a suggestion of a pre-ignition, I am inclined toward the former theory, but, nevertheless, I shall take the first opportunity when the motor is overhauled to put a chisel into those combustion chambers and remove the ridges. I may remark that the entire outfit of mirror, lamp, socket and cord cost but 85 cents.

Care of the Gears.—If the driving gears of your car grind together when they are shifted, and go into mesh with difficulty, it is likely to be because the shaft bearings are worn so that the shafts are out of alignment. If one of the gear shafts has a bearing in the driving pinion, and drives direct upon the high speed, it may be that that bearing has not been sufficiently lubricated, owing to the oil or grease in the gear case being too stiff to reach it. If such a bearing begins to cut it will go to pieces

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in a hurry. Any loss of alignment in the gear shaft bearings is very destructive to the gears, as it results in all the pressure being thrown onto one end of the teeth instead of being distributed evenly along their length. If these shafts run in plain bearings the oiling arrangement of the latter cannot be scrutinized too carefully.

The Clutch and Brake.—If the emergency brakes are independent of the clutch it is possible to use the engine as a brake when descending hills, and employ the emergency brakes only to supplement the engine in case the braking power of the latter when throttled is insufficient to hold the car back. It is an exceedingly convenient arrangement, and very economical in wear and tear on the brakes, and it is to be found on some of the very best cars made. Nevertheless, there is a certain amount of danger in it for one who is not accustomed to the arrangement, as it is easy in an emergency to forget to unclutch before applying the brakes. There seems to be some reason for thinking that the shocking Harrison accident, in Long Island City, last month, was caused in part by the chauffeur failing to unclutch when he applied the brakes, after discovering that the direction of the car was no longer under control. Probably one who has always been accustomed to unclutch each time he applies his brake is in no danger of forgetting this operation, but for one who has been accustomed to the other arrangement it may be said that he should not change unless he is quite certain of his presence of mind in any emergency.

Keeping Rivets and Bolts Tight.—Any rivets found loose or partly sheared from vibration or racking should be replaced at once, otherwise the stresses that are intended to carry are transferred to other parts less able to bear them, with the result that the damage progresses rapidly. It is easier to replace one rivet as soon as it is found to be loose than to replace a dozen which have loosened one after the other, because the first one was not attended to. The same thing may be said of all bolts subject to vibration, and that means pretty nearly every bolt in the car. If the car is so carelessly put together that the holes are too large for the bolts, the latter will work loose in spite of every attempt to keep them tight, unless they are of excessive size. The only thing to do is to ream out the holes and make new bolts, either of the next larger standard size, or of an intermediate size, turned down to a shoulder for the threads, and made a drive fit in their holes. When this is done the trouble should be cured at once for all, unless the bolts are so small or soft that they simply shear off, regardless of how they fit. One part of the automobile's anatomy where this operation is quite frequently necessary is in the bracket which holds the steering column. Another, I am almost ashamed to say, is in the holding down bolts of the motor itself, which very frequently are much too small to stand the continual jarring to which they are subjected.

Gear Case Oil for Cold Weather.—What is commonly known as gear-case oil is a low grade of steam-cylinder oil, very dark and of an olive tinge, and almost as heavy as molasses. When churned by the gears it thickens rather rapidly, presumably owing to oxidation, and after a while, if allowed to stay in the gear case, it becomes as stiff as grease. If there are any inside bearings which require to be lubricated by the oil in the gear case, such a condition as this is very detrimental, since it practically shuts off all lubrication from these bearings. My own plan in cold weather is to add one quart of kerosene to three to four quarts of gear-case oil, thus making the oil thin enough to stand several hundred miles in ordinary winter weather. It should be drawn off (or, rather, scooped out, for it is probably too thick to draw off), and replaced rather frequently, as it is too thick to permit any appreciable settling of the grit worn off from the gears.

AMERICAN LOCOMOTIVE MOTOR CAR

BERLIET

=TOUJOURS PRÊT=



Recognized leading foreign car
Selected by our engineers
Because of its simplicity and reliability
To reproduce in this country,
At the Providence Works of the
American Locomotive Company,
Using French Models, Materials and methods.

One of the features of the show in the
69th Regiment Armory, New York.

Sizes 24-30 and 40-50 Horse Power
Built under Berliet License

American Locomotive Automobile
1776 Broadway Company New York

INTERESTED IN THE 1906 MODELS OF MOTOR-CARS?

MOTOR'S

Third Annual, Illustrated 1906,

MOTOR-CAR DIRECTORY

Will tell you all about them. MOTOR'S MOTOR-CAR DIRECTORY is a symposium of motor-car information—a complete digest (illustrated) of the specifications and other details of all the models of every manufacturer, foreign and domestic, licensed and unlicensed. It would take you weeks, if not months, months, of valuable time to get this information in any other way.

Besides showing a photograph of each motor-car this DIRECTORY tells by whom and where each car is made; the model and its price; the horsepower; the motive power; the seating capacity; the number and kind of brakes; the size and style of tires; the number, position, and methods of cooling, of cylinders; the kinds of ignition; clutch; driver; body frame; transmission; the number of speeds; the length of wheel base; the width of tread; the weight—all that will aid you, the prospective buyer, in making a satisfactory selection.

This directory was published in the January issue of MOTOR, and such was the demand for that number that the entire edition was sold out within a week after publication. The demand for the DIRECTORY continues and we are revising and enlarging it, and will publish the

DIRECTORY IN BOOK FORM

Only a limited number of copies of this revised form of the DIRECTORY will be issued, and if you wish to secure a copy send in your order now. It is bound in cloth.

Merely do this—Write your name and address in the coupon below—tear it off and enclose it with one dollar in an envelope and mail to MOTOR, 1789 Broadway, New York City

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Compound



As Good as the Best Better than the Majority

Economical and Absolutely Reliable at all Seasons

16 H. P. Doctor's Stanhope, $1400.00



16 H. P. Light Touring Car, $1400.00

Duplicate of Winner in New York Motor Club's National Economy Test

E. H. V. CO. : Middletown, Conn.



Dolson's

Model "F"

4 Cylinders, 45-50 H.P. Full Aluminum body. Rear Axle, Floating type. Nickel steel construction, $2,500.

Dolson 1906 Models are the Results of Many Seasons of Watchful Care for the Weaknesses of the Automobile as Revealed by the Severe Demands of American Country Roads

Model E 28-32 H.P., 4 Cylinder, Shaft Drive, $1,800

Model D 20-24 H.P. Under Hood. Shaft Drive, $1,500

Model C 2 Cylinder, 20-24 H.P. The most powerful car of its type on the market $1,250.

Dolson Automobile Company

BOSTON AGENCY: Imperial Automobile Co., 1044 Boylston St., Boston, Mass.

CHARLOTTE, MICH., Pearl and Lovett Streets.

THE 200 M. P. DARRACQ.

On Saturday, December 30, 1905, Hemery, in a 200 M. P. Darracq, beat the world's flying kilometer record upon the road from Arles to Salon, France, by making the kilometre in twenty and three-fifths seconds, corresponding to a speed of 175.757 kilometres an hour. It was with this wonderful performance that the sporting year of 1905 closed. The record which had just been beaten belonged to Barras, who made it in a Darracq car of lower power in twenty-one and two fifths seconds.

Hemery reached Salon in the morning of the above-mentioned date. His car was weighed on the public scales in the presence of M. Bertin, president of the Automobile Club of Salon, and MM. Gaudichard and Hunziker, official timekeepers of the Automobile Club of France. The weight was ascertained to be 900 kilogrammes. The motor power was about 200. Hemery afterward attacked the record and made three trials in the Arles-Salon direction, in conformity with the prescriptions of the regulation of records. He had along with him Demogeat, his mechanic. The car had to face a contrary wind, which was icy cold. Notwithstanding this, the trials gave, in succession, the kilometre in twenty and three-fifths, twenty and four-fifths and twenty and three-fifths seconds. Greater regularity than this would have been impossible. It is probable that with more favorable weather the time made would have been better.



THE MOTOR OF THE 200 MOTOR-POWER DARRACQ

The car that has just gained such success has an eight V-cylinder motor mounted upon the same case and actuating same crank.

The water tank, which is of conico-cylindrical form, is placed between the cylinders. The ignition is effected by a Niemport magneto. The cylinders have a bore of 6¼ inches, and a stroke of 5½, or 170x140 mm. There are two speeds, of which the second is in direct engagement. The radiator, which was constructed by Grouvelle and Arquembourg, is placed as a wind-break. The chassis, which was constructed by Arbel, is of pressed steel. The wheels are provided with metal spokes. The gasoline tank is placed behind the driver's seat. The suspension is of the Truffault and the pneumatic tires of the Dunlop type.

The Hemery car was constructed with a special view to making the above record.



THE FIRST FORD CAR

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GROUT

30-35 H.P., 4 cylinder, balanced motor, high tension ignition using one coil with distributing commutator.

Forced Ventilation by fan.

Mechanically operated valves.

Inlet valves interchangeable with exhaust valves.

Control on steering wheel to gas and ignition, no motion transmitted to these levers by movement of steering wheel.

Gear, three speeds and reverse actuated by single lever.



Wheels, 32 in. artillery, wood, ball bearings, 4 in. tires.

Armored frame.

Steering by irreversible worm and sector, dust proof and oil tight.

Lubrication; mechanically operated oiler, a definite amount of oil to all cylinders, crank bearings, connecting rod bearings, etc.

Lubricating system has received great attention and is particularly thorough. It is non-adjustable, that is, set at the factory, and feeds only to be supplied with oil.

GROUT GASOLINE CAR. PRICE, $2,500. 30-35 H. P.

Including Top, Two Headlights with generators, Two Oil Lamps, full set of Tools, with Tire Repair Kit

Grout Cars Are Simple in Operation and Strong and Durable in Construction

GROUT AUTOMOBILE CO., Orange, Mass.

New York Agency, - - MUNSING & CHAPMAN, No. 1855 Broadway

Chicago Agency — Twentieth Century Motor Car Co., Michigan Ave.

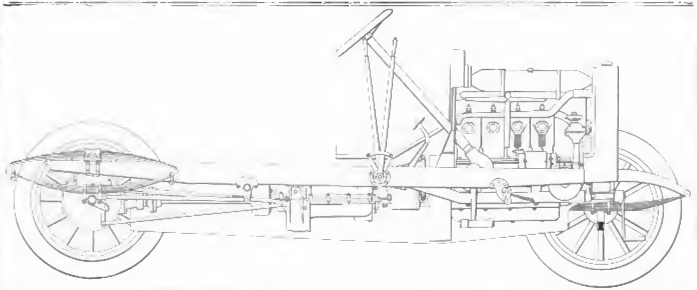
Boston Agency—Paul R. Curtis Co. Motor Mart, Park Sq.

Denver Agency—A. T. Wilson, 1558 Broadway.

MOORE AUTOMOBILE COMPANY

571 FIFTH AVENUE

NEW YORK



MOORE 40 H. P. CHASSIS

"THE BALL BEARING CAR"

EVERY REVOLVING SHAFT ON BALL BEARINGS

SIMPLICITY IN CONSTRUCTION AND OPERATION

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The World's Champion
Brasier
(Formerly Richard-Brasier)

25-36 H.P.
1906

E. B. Gallaher
228-230 West 58th St., N. Y.
Tel., 1503 Columbus Cable Addresses, Brasier, New York. Gallaher, Paris.



AGENT AND SOLE IMPORTER
Richard-Brasier
GENERAL EASTERN DISTRIBUTER
The Cleveland Car

PARIS, No. 11 RUE D'ALGER





A Maxwell-Briscoe suspended in front of Cafe Martin.



The design of an Advertising Novelty at the show.

Everything in Electrics

from the handy delivery wagon
to the luxurious brougham





Our line includes over 100 standard designs of the better class of electric vehicles, adapted to every social need or business requirement. Illustrated catalogue mailed free on request.

VEHICLE EQUIPMENT COMPANY
Borden Avenue, Long Island City New York
Largest builders of commercial automobiles in the world.

1906 Models Now Ready



MODEL E, 30 H. P. GLIDE

GLIDE Model E is a 30 h. p. car with a vertical four-cylinder motor. Bevel gear drive. Graceful design and beautiful finish. Our new Model F is an 18 h. p. car with a two-cylinder horizontal opposed motor. Both of these cars are winners in their respective classes. Advance catalogues are now ready.

THE BARTHOLOMEW CO.
413 BRADLEY AVE. PEORIA, ILL.
Member American Motor Car Manufacturers' Association.

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UPTON

$3,000 $3,000



40 H.P., 4 cylinder, water-cooled, sliding gear transmission, with D. W. F. ball bearings; 3 speeds forward and reverse; shaft drive; spark and throttle on sector within wheel, also foot accelerator; internal expanding metal clutch, allowing perfect smoothness in starting; wheel base, 109 inches; motor with extra large bearings and heavy nickel steel crank shaft. A new and positive oiling system.

Exclusive Agents for New York **MENDEL, DALE & CO.** **219 WEST 58th Street NEW YORK**

'Phone, 3387 Col.

The Jewell

A PERFECT CAR for $400.00

If you buy this car for $400.00 you buy $400.00 worth of car not of trouble



THE JEWELL is a car thoroughly built from the ground up, which runs quietly, with no vibration, climbing all grades and going through mud and sand.

THE JEWELL is the result of years of experiments by two of the best engineers in the country. This result has come in the form of a car that will absolutely do the work and meets all the requirements of the business and professional man.

Among the good points of THE JEWELL are its Attractive Appearance, Perfect Control and Economical Operation and Maintenance.

For Information, Address,

The Forest City Motor Car Company

MASSILLON, OHIO

GAS-AU-LEC

"THE SIMPLE CAR"



Elegant in Finish
Luxurious in Appointments
Built by Skilled Workmen from the Best Materials obtainable

The Simplest Gasoline Car in the World

Both as to Construction and Control and the easiest to operate and maintain. Not only eliminates many objectionable features common in automobile engineering, but possesses points of excellence not found on any other car.

Positively self-starting from the seat every time

No cranking under any circumstances.

40-45 Horse Power with Quinby Aluminum Tonneau **$5,000**

Limousine or Special Bodies to Order.

"Marks a New Era in Automobile Construction"

CORWIN MANUFACTURING COMPANY

Peabody, Mass., U. S. A.

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BOLLEE

A TOURING CAR *of the* HIGHEST GRADE



Judge its standing by this list of some of the most prominent purchasers of BOLLEE CARS

T. A. Havemeyer	Joseph E. Widener	Ernesto G. Fabri	J. C. King
Cortlandt F. Bishop	A. G. Hodenpyl	Alfred G. Vanderbilt	E. L. Ryerson
John F. Talmage	W. P. Hamilton	H. P. Whitney	George C. Rand
C. L. Blair	William Rockefeller	Charles Carroll	H. O. Havemeyer
J. Borden Harriman	James Stillman	Royal P. Carroll	B. B. Odell, Jr.
Payne Whitney	Oliver Ames	George J. Gould	Whitelaw Reid
Wm. Payne Thompson	J. M. Ellsworth	Louis S. Thompson	Col. A. R. Kuser

IMMEDIATE DELIVERIES **STORAGE AND REPAIRS**

OUR NEW GARAGE WILL BE OPENED
TO THE PUBLIC FEBRUARY 15, 1906

Dealers in all Makes of Foreign Motor Cars

CRYDER & COMPANY

T. A. Havemeyer *Henry C. Cryder*

N. E. Corner Park Avenue and 63d St.
NEW YORK

EXCLUSIVE AGENTS IN THE U. S. FOR LEON BOLLEE MOTOR SYNDICATE, Ltd.

WANTED

A Man With a Need

If you want to buy anything, if you want to sell anything, if you want a Chauffeur or a Mecanicien, if you want anything in the world of motoring, you want

Motor Messengers

A little "Want Advertisement" or MOTOR MESSENGER in the next issue of MOTOR will give results to fit your needs.

In a few words, write your "want" and mail it to MOTOR with the price of the MOTOR MESSENGER at

5 Cents a Word

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A FEW FACTS ABOUT THE INTERNATIONAL EXPOSITION, MILAN, ITALY.

IN order to appropriately celebrate the completion of the Simplon Tunnel—one of the greatest known triumphs of engineering—an International Exposition under royal patronage will be held in Milan from May to November, 1906.

It will be the largest European exposition ever held outside of Paris. Practically all of the European countries will participate officially, as well as several of the Asiatic nations.

In the transportation section, retrospective exhibits will show the historical development of the various methods of travel. The dominant feature will be Motion. All products, as far as possible, must be shown in connection with the processes, thus filling the halls with *live* exhibits. Arrangements will be made for field tests and competitive trials in all classes where it is expedient. An especial feature will be the motor car display, to which an entire pavilion will be devoted. This "show" will terminate in midsummer so that machines exhibited may be sold for early delivery.

The marvelous industrial and economic development of the kingdom during the past decade has made Italy the best European market for those products that the United States can well supply.

Milan is the center of the most productive section of Italy. Its population is one and a half million, while Lombardy, no part of which is more than three hours distant, has nearly five million inhabitants.

Genoa, the port of entry, is less than one hundred miles distant. The cost, therefore, of transporting exhibits from the United States will be comparatively cheap. (For rates apply to North German Lloyd S. S. Company, 5 Broadway, New York City.)

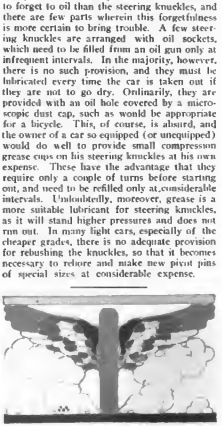
For terms of space or further information, application should be made to

J. H. Gore,
George Washington University,
Washington, D. C.

Or

L. S. Ware,
54 Rue de la Bienfaisance,
Paris, France.

Oiling the Steering Knuckles.—There are few parts of the average car which it is easier to forget to oil than the steering knuckles, and there are few parts wherein this forgetfulness is more certain to bring trouble. A few steering knuckles are arranged with oil sockets, which need to be filled from an oil gun only at infrequent intervals. In the majority, however, there is no such provision, and they must be lubricated every time the car is taken out if they are not to go dry. Ordinarily, they are provided with an oil hole covered by a microscopic dust cap, such as would be appropriate for a bicycle. This, of course, is absurd, and the owner of a car so equipped (or unequipped) would do well to provide small compression grease cups on his steering knuckles at his own expense. These have the advantage that they require only a couple of turns before starting out, and need to be refilled only at considerable intervals. Unhabitedly, moreover, grease is a more suitable lubricant for steering knuckles, as it will stand higher pressures and does not run out. In many light cars, especially of the cheaper grades, there is no adequate provision for rebushing the knuckles, so that it becomes necessary to rebore and make new pivot pins of special sizes at considerable expense.



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Iroquois



TYPE "C"—25-30 H. P. 4 1-2 in. bore, 5 in. stroke, detachable tonneau, side entrance, 4 or 5 passengers, light touring car. PRICE—With standard equipment f. o. b. Seneca Falls, $2,250. Tops extra.
35-40 H. P. 4 cylinder, $2,500.

An evolution in automobile development. Noted for quality, strength, mechanical excellence and low cost of maintenance

"IROQUOIS" are automobiles of rare merit and acknowledged reputation. The result of years of painstaking effort intelligently directed. They are equipped with 25-30 and 35-40 H.P., 4-cylinder, water-cooled, vertical motors, mechanically-operated valves, jump-spark system improved clutch, sliding transmission gear, 3 speeds forward, one reverse. Spark and throttle control located on steering post, double-acting brakes. Elliptic springs in front, and scroll-end elliptic springs in rear, giving to the car an easy-riding motion and doing away with all jolts and jars. Reliable agents wanted. Prompt shipment after Feb. 16th.

Iroquois Motor Car Co. Seneca Falls, N.Y.

De Dietrich Import Co.



HAVE opened their Automobile Show Palace at No. 3 West 44th Street, opposite Sherrys, where their 1906 models may be seen.

The Model F Cleveland

30-35 Horsepower

The Car Without A Weak Spot



Showing the Cleveland Model F equipped with the Tulip body. Price $3,500

THE buyer of a Model F Cleveland can safely eliminate the cost of repairs as a factor. Its economy is a tangible asset, due to harmony of strength, design and construction.

The repairs on fifty 1905 cars in constant use averaged $4.00, including time.

One Boston car ran 6,000 miles at a repair expense of $3.90. One New York car ran 9,000 miles at a repair expense of $6.00—$4.00 of which was for spark plugs.

The CLEVELAND has real, solid, tested, standing-up ability. The complete chassis is made by the Garford Company, the largest manufacturers of exclusively high-grade automobile parts and chassis in America. It has no weak spots; we guarantee you against them. Price, $3,500 to $5,000, depending upon body equipment.

The ignition is by the imported Simms-Bosch low tension Magneto, with which all important foreign cars are equipped. The spark is make and break and controlled by the speed of the engine—doing away with spark plug, coils, intricate wiring and batteries. This ignition was used on the first seven cars, the last Gordon Bennett Cup Race.

The carburetor is automatic and requires no adjustment. It will not flood. The exhaust on the muffler prevents dust from coming in the rear of the car. Weight, 2,400 lbs., equipped for the road.



Showing the Cleveland Model F equipped with the Victoria body. Price $3,500

SPECIFICATIONS

4 cylinder 30-35 H.P.
Imported Simms-Bosch Magneto automatic make and break spark.
Direct drive, Nickel steel I-beam front axle.
34x4-inch wheels. Ball bearings.
Wheel base, 104 inches.
Simplex control, 3 to 33 miles on high gear.
Absolutely noiseless.
Body, option Victoria or Tulip, as illustrated.

Price, $3,500 to $5,000, depending upon Body Equipment. The 20-H.P. Model D will be continued without change. Price, $2,800. Both models guaranteed for one year. Catalogue and full information on request.

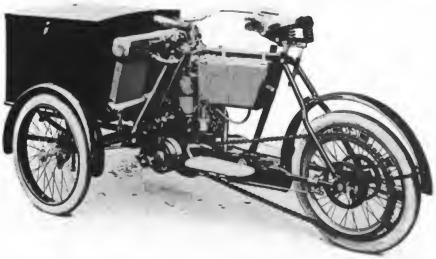
Cleveland Motor Car Co., Dept. L, Cleveland, Ohio

General Eastern Distributing Agent, F. B. Gallaher, 228-230 West 58th Street, New York. Boston: Butler Motor Car Co., 998 Boylston Street. Chicago: The Cassiday-Fairbanks M. C. Co., Michigan Avenue and 14th Street. St. Louis: St. Louis Automobile & Livery Co., 3900 Olive Street. So. California: A. P. Warrington, Los Angeles, Cal. Buffalo: Cleveland Auto & Cycle Co., 640 Main Street. Owing to the unusual interest in the Cleveland car, agents in unassigned territory are advised to enter into early negotiations.

Chicago Automobile Show, 1st Regt. Armory, Spaces A-25 & 2

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"ASTER" TRI CARS

Particularly adapted for light and quick deliveries for *Florists, Laundries, Butchers, Grocers, Bakers, Dry Goods, Clothiers, Confectioners and every Merchant whose business requires prompt deliveries.*

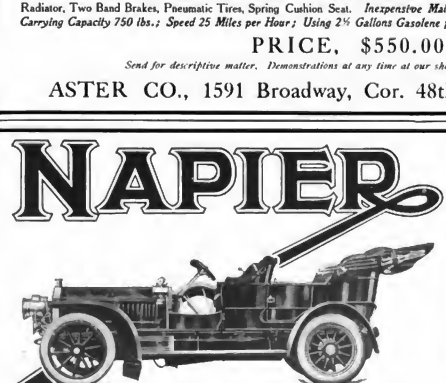
ASTER TRI CARS are Chain Drive, 2 Speed Transmission Aster Motors, 4½ H. P. Vaurs Carburettor, Water Cooled Radiator, Two Band Brakes, Pneumatic Tires, Spring Cushion Seat. *Inexpensive Maintenance, Needs No Mechanic To Operate; Carrying Capacity 750 lbs.; Speed 25 Miles per Hour; Using 2½ Gallons Gasolene for a Day's Run.*

PRICE, $550.00

Send for descriptive matter. Demonstrations at any time at our show rooms. Agents wanted.

ASTER CO., 1591 Broadway, Cor. 48th Street, New York.

NAPIER



Napier Touring Car, 60 H.P. Six Cylinder. Model of 1906. Price, complete with Top, **$8,000.00**

Finest of Material, Workmanship and Finish

The Napier is not only the best and most comfortable car, but the most elegant one built in America

45 H. P. 4-cylinder, complete with Top.	18-20 H. P. 4-cylinder Runabout. Two styles.
$6,500.00	**$2,250 and $2,500**

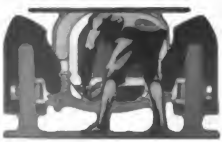
Napier Motor Company of America
743 Boylston St., BOSTON, MASS.
NEW YORK BRANCH: 1610 Broadway

THE GOBRON-BRILLE CAR.

A NEW French importation into this country is the Gobron-Brille, which for two years held the kilometre record after the company had withdrawn from racing. The American agency is held by E. V. Hartford, president of the Hartford Suspension Co.

"The feature of the Gobron-Brille car," said Mr. Hartford, "is the explosion in the centre of the cylinder. One piston goes up and the other down, supplying double power and less gasoline consumption, whereas in an ordinary four-cylinder car the explosion takes place at the top of the cylinder and the piston goes down while the remainder of the charge is lost against the head of the cylinder. The Gobron-Brille patents have five years to run and most of the European manufacturers are trying to secure a motor of some sort that will be as flexible as Mr. Gobron's. So confident is Mr. Gobron regarding the speed of the car that I am ready to take an order for a racing machine which I will guarantee to travel two miles in a minute or no sale.

"Regarding the Truffault-Hartford Suspension," continued Mr. Hartford, "I might say that although the device originated in France, we secured the patent rights here. Our recent improvements of the 1906 model were considered so good that the French firm will manufacture them on the same designs and pay us a royalty."



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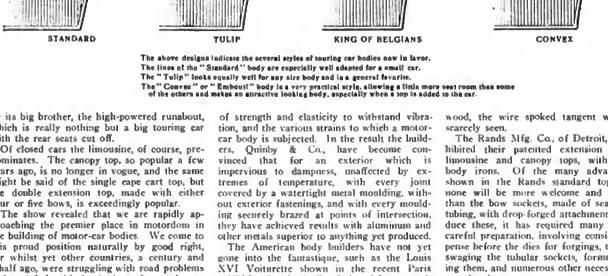
BODIES AND TOPS AT THE SHOWS

BODY making as indicated by the exhibits at the shows has progressed along the several lines and types which are shown in the illustrations in the center of this page. The rear-entrance tonneau is a thing of the past, and henceforth the word "tonneau" must be eliminated from the motor-car nomenclature, because we will have no further use for it. The word "tonneau," speaking philologically, means, in the wine and beer-making countries of Europe, a huge round or rather elliptical tun or vat, and certainly the name was well applied to the first type of narrow rear-entrance bodies whose doorways are no wider or larger than the proverbial hunghole, and were about as easy for an able-bodied man or woman to get in or out of.

As the statistics show, the side-entrance standard touring body is the most popular, followed very closely by the tulip type, the bulging King of the Belgians following next, and the convex type, which is so new as not to be common, last at present, but certainly not so for the future. Even the runabouts have shown the influence of straight line carriage construction, the familiar Olds curved dash Oldsmobile now being also produced with a straight dash piano box body. The low powered runabout is, of course, still popular, being largely reinforced vent of the locomotive every main road in the country was alive with the lightest, safest, and strongest stages the world has ever seen. Not only that, but the one-horse shay and the covered or open chariot had no equal, and has never been excelled.

There is no wonder that the builder of the mechanical parts of the motor, turned with confidence to the old firms whose experience went back well-nigh a century—really the wisdom of ages—to co-operate with them by taking off their hands the responsibility of the bodies and wheels, or that so many motor-car builders to-day in their specifications leave the choice of style, and often of the body builder, to the option of the purchaser of their chassis.

The body and wheel builders have responded to the new demands with an alacrity and ingenuity beyond all praise, and to them the trade and the motoring public are deeply indebted. Nothing has stood in the way of their enterprise; they have adopted the old styles to new needs, and invented new forms to meet every requirement, even to the casting away the use of wood and the adoption, more especially in the past year, of sheet aluminum as the best material for a body which should combine a minimum of weight with a maximum



The above designs indicate the several styles of touring car bodies now in favor. The lines of the "Standard" body are especially well adapted for a small car. The "Tulip" looks equally well for any size body and is a general favorite. The "Convex" or "Embonit" body is a very practical style, allowing a little more seat room than some of the others and makes an attractive looking body, especially when a top is added to the car.

by its big brother, the high-powered runabout, which is really nothing but a big touring car with the rear seats cut off.

Of closed cars the limousine, of course, predominates. The canopy top, so popular a few years ago, is no longer in vogue, and the same might be said of the single cape cart top, but the double extension top, made with either four or five bows, is exceedingly popular.

The show revealed that we are rapidly approaching the premier place in motordom in the building of motor-car bodies. We come to this proud position naturally by good right, for whilst yet other countries, a century and a half ago, were struggling with road problems and satisfied with lumbering, clumsy, heavy, arks on wheels, America had evolved the Conestoga wagon and the Concord coach. As early as 1755, when the English General Braddock, was leading his ill-fated expedition into Western Pennsylvania, Benjamin Franklin gathered for him, in the counties of York and Lancaster in that State, a better supply of strong bodied, sound wheeled wagons for the transportation of the commissariat and ammunition, than could have been gathered in all England. The Conestoga wagon was the wagon which saved the day for the British in their recent campaign in South Africa; and half this continent and all Europe is familiar with "Old Deadwood," the Concord coach which was doing duty more than a century ago, and still rattles round, whole and sound, at every exhibition given by Buffalo Bill. Until the advent of strength and elasticity to withstand vibration, and the various strains to which a motor-car body is subjected. In the result the builders, Quinby & Co., have become convinced that for an exterior which is impervious to dampness, unaffected by extremes of temperature, with every joint covered by a watertight metal moulding, without exterior fastenings, and with every moulding securely brazed at points of intersection, they have achieved results with aluminum and other metals superior to anything yet produced.

The American body builders have not yet gone into the fantastique, such as the Louis XVI Voiturette shown in the recent Paris exhibition, but for bodies designed for strength and comfort, they have produced a collection of results which may challenge the world. Not only is this so in bodies, but in tops and covers, adjustable, collapsible, and removable, they entered into the field of design better equipped than any other nation. The climatic conditions here have been a potent factor from the beginning of road travel in producing designs, which, whilst cosy enough for our short but rigorous winters, should be adaptable either as completely open for suitable seasons or top-covered to protect the inmates from our torrid semi-tropical summer sun.

The advent of the motor-car merely enlarged a field already ancient and called into existence a greater amount of ingenuity than had therefore been necessary, in order to meet the new requirements. How well that need was met the shows testify abundantly. By the very nature of their work, however, the individuality of the body maker was merged in the name of the maker of the car, and whilst thousands were admiring the style and finish of a car which was the talk of the show, they were in fact admiring the design and workmanship of the carriage body maker.

So it happens that the exhibits of this vast and important industry bore no comparison to its output, and firms like the Springfield Metal Body Co., the Sprague Umbrella Co., of Norwalk, Ohio, the Detroit Motor Car Supply Co., and other firms, which have designs and measurements for tops for nearly every car on the market, were represented only by a few each of the many specimens they make, but the few were enough to prove the high class of their craftsmanship, both in metal and wood.

In the manufacture of wheels there has been little diversity, the old American second growth hickory in the hands of such makers as Phineas Jones never has been and never can be beaten, so long as wood is used, and there seems little desire to attempt to better it; only one firm at the shows exhibited any deviation, and that was a steel wheel, the Midgley, based on the same lines as the otherwise universally used "artillery" wheel of wood, the wire spoked tangent wheel being scarcely seen.

The Rands Mfg. Co., of Detroit, Mich., exhibited their patented extension top, semi-limousine and canopy tops, with concealed body irons. Of the many advanced ideas shown in the Rands standard tops, perhaps none will be more welcome and appreciated than the bow sockets, made of seamless steel tubing, with drop-forged attachments. To produce these, it has required many months of careful preparation, involving considerable expense before the dies for forgings, the dies for swaging the tubular sockets, forms for bending them, and numerous other necessaries were completed.

The Detroit Motor Car Supply Co. exhibited at both shows their line of auto tops, bodies, and wind shields.

The Automobile Cover & Top Mfg. Co. exhibited their complete storm outfit with side curtains and boots, lamp cover, arched cape cart tops with slip cover and leather bound slip covers for protecting seats and backs.

The Pantasote Co. had a display of their Pantasote leather, an ideal material for covering seatings and canopies.

P. Minty & Co., of Boston, had a good exhibit of their double texture mackintosh cloth adaptable to any weather-want of the wildest day, as well as to the passing shower, and their artificial leather, effectively taking the place, for many purposes, of the more expensive genuine article.

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CHASSES AT THE SHOWS

Were in great variety of finish and detail, besides being in section and in operation.

Rochet-Schneider.
Fiat.
Haynes.
Cadillac.
Northern (two).
Knox.
Pope-Hartford.
Clement-Bayard (two).
De Dietrich.
Hewitt (two).
Oldsmobile.
Renault.
Locomobile.
S. & M. Simplex.
Thomas.
Columbia (two).
Winton.
Stearns.
Pierce.
Franklin.
Walter.
Packard.
Locomobile, business.
Stevens-Duryea.
Autocar (two).
Royal.
Apperson.
Peerless.
Studebaker.
Pope-Toledo.
St. Louis.
Corbin.
Ford.
Cleveland.
Grout.
Wayne.
Lozier.
Acme.
Moon.
Lambert.
Rambler.
Rainier.
National.
Ardsley.
Maxwell.
Stoddard.
Premier.
Reo.
Aerocar.
Brasier.
C. G. V.
Renault.
Napier.
Peugeot.
Leon Bollee.
Martini.
Mercedes (two).
English Daimler.
Delaunay Belleville (two).
Berkshire (two).
Viqueot.
Welch.
Frayer-Miller.
Berliet.
De Leon.
Hotchkiss.
Aster.
Ariel.
Windsor.
Dorris.
Pungs-Finch.
Westinghouse.
Marion.

THE NEW YORK SHOWS.

(*Continued from page 53.*)

of one of the standard motor-car body makers.

On the Matheson was found an improved glass wind shield having a narrow frame so that almost the whole surface of the glass was in use. On the Fiat a peculiarity noticed was that no fan was employed to aid the water cooling system, the magneto now used being of the governed type, a new brake equalizer being also fitted and all brakes being water cooled.

Regarding the difference in type between foreign and American cars, it might be well said here that all the foreign cars run on one conventional type, differing solely in detail of construction. The four-cylinder vertical type is almost universally used, the sole exception being the six-cylinder Napier motor.

All the foreign cars are water cooled, although they have some considerable variation in their form of radiators and location of them, the Mercedes carrying the honeycomb radiator in front, the Renault carrying it envred on the dash, and the C. G. V. carrying their coil between the front springs. Nearly all the foreign makers run towards the pressed steel type of frame, the notable exceptions being the Panhard with a *bois-de-arme* frame, and the C. G. V. with its tubular frame reinforced by square wooden rods which are forced into it.

The foreign makers also use ball bearings more largely than do the American makers, the best practice using them all over as in the Mercedes. None of the foreign cars use anything save a sliding gear transmission; these, however, being divided between the successive type and the selective type with the gate control, such as is used on the Mercedes.

In the Armory show the same general conditions and tendencies naturally prevail as in the Garden show, especially so among the foreign cars. The Armory show, however, was much more typical of real American mechanical construction and ingenuity, and although we would not go so far as this, one radical expert declared "that the Garden show was that of yesterday, and the Armory show was of to-morrow." The Armory show had a number of friction drive transmissions, among them in operation being the Lambert and the Windsor, both booths being always crowded with sightseers.

The Lozier showed a new method of finishing cylinders, such as they use in their marine motor practice, by baking them in a hard, durable gray enamel. The National had a new form of double steering construction. The Mitchell placed the exhaust valves on top of the cylinders, and on the Corbin was a steel pan construction supporting the motor, the high tension ignition system being synchronized and using a single coil, a selective system of transmission also being employed. Both the Moline and the St. Louis showed the three-point spring suspensions.

At the Baker booth was found an extreme novelty in an electric speed wagon. The five-cylinder air-cooled Adams in the basement was of the revolving type without a flywheel directly connected to the shaft, the motor itself serving as a flywheel. The Marmon air-cooled attached to its famous three-point suspension had four-cylinder air-cooled motors operating on one crank shaft, the motors being set 90 degrees apart from each other, two on a side, a peculiarity of the construction being that the drive was really direct, no universal shaft coupling being used owing to the merit of the suspension.

On the Westinghouse air-cooled brakes were used and a special carburetor having two extra air inlets for which 83 per cent. of efficiency was claimed. The only tri-car in the show was the Hendee, tri-cars evidently not being so popular here as they are abroad.

On the Mors was shown its new starting device, which took the prize in the starting device competition at the Paris show.

THE ORMOND-DAYTONA RACE MEET.

The race meet which for the past several years has been a fixture in the motor-car racing world of the greatest importance, not only to this side of the "pond," but also to the other side, was held during the week of January 22 and continued until the following Monday, too late to enable us to get all the results of the race into the body of this issue.

That previous records would go by the board went without saying when it is known that so many high power racers were entered—the 80 m.p. Napier, the 200 m.p. Darracq, the big Ford and Wayne, the Fiats with such drivers as Lancia and Cedrino, and the English Daimlers. The freak steamer driven by Marriott, too, was expected to do something.

The complete record in word and picture of the Ormond-Daytona meet will be found in a supplement with this issue.

KINWOOD RADIATOR.

THE Kinwood Radiator, made by the Kinsey Manufacturing Company, of Dayton, Ohio, is of the flat vertical tube variety having great efficiency owing to its peculiar fin construction. It is the result of careful experimenting to produce efficiency with liberal water spaces without delicate construction which is likely to cause leaks on account of road strains opening the joints. It is substantially built to withstand strains, hence it has very few joints, and its construction is such that it can be subjected to a considerable degree of freezing without serious damage.

It is a well known fact that radiation takes place quicker from points and edges than any other portion of a fin, therefore, the efficiency is secured by a very large percentage of edge fin surfaces all close to, and having large contact surface with, the body of water.

Water spaces are 3 9/16 x 3/16 inches, large enough to allow an unobstructed flow without danger of stoppage by scale or small particles of dirt, yet thin enough, in connection with the large fin surface, to cool rapidly. The flat tubes are flanged into tanks at top and bottom, and are of such a shape that crystallization from cold does not cause leaks. The wide flat tube construction being continuous from the front to the back of radiator is superior to the multiple tube because a stronger joint connects tubes with the tanks and there is no unequal expansion to break the joints.

In case of damage the Kinwood radiator is easy to repair; joints are only few in number and every joint can be reached from the outside with a soldering iron.

In tests against standard radiators it has shown the greatest efficiency per pound of weight. One user says: "I never saw a radiator so much cooler at outlet than inlet." This proves cooling efficiency.

The material used is the best grade of each kind, worked up and tested out by high grade mechanics.

The Kinsey Manufacturing Company also makes hoods, fenders, tanks, of any desired styles and sizes; pressed steel frames; one piece pressed steel dashes, 4 inches deep; brass mouldings for steps, tool and battery boxes; a gasoline gauge, which will show the height of the gasoline in the dark as well as in daylight, and other specialties in sheet metals.

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WATERPROOF CLOTHS

For

AUTO TOPS

STORM SHIELDS, SLIP COVERS, ETC.

All Grades and Colors in Both Foreign and Domestic Fabrics

OUR SPECIAL FEATURE is the COLOR of our Domestic Twills, Drills, Jeans and Sateens. These are as near ABSOLUTELY FAST COLOR as it is possible to dye either cotton or wool. After five weeks' test in the open air, exposed to the sun and rain, the change is hardly noticeable.

Ask to see THE TESTED SAMPLES at Space A-57, at the FIRST REGIMENT ARMORY, Chicago, Ill., Feb. 3rd to 10th.

We also make a line of Rubber Surface Cloths and Artificial Leathers in all the popular colors and grains. Our Artificial Leathers are coated on regular Mackintoshed Cloths, which is DOUBLE PROTECTION, making them ABSOLUTELY WATERPROOF. Most Artificial Leathers do not have the EXTRA RUBBER COATING.

WE MANUFACTURE HIGH GRADE RUBBER CLOTHS of EVERY DESCRIPTION

L. J. MUTTY CO., BOSTON, MASS.

KING AUTOMOBILE TOPS

We are not Imitators, but Originators



THE top is an important part of the equipment of the up-to-date automobile. If you want one with plenty of style, light in weight, yet strong and durable, investigate the KING line. It is the most complete on the market. Any style, any color, any size, made for any machine. Get our catalogue, samples and prices and you will not purchase elsewhere.

ALWAYS SPECIFY KING TOP ON YOUR NEW CAR

PROMPT SHIPMENTS GUARANTEED

King Manufacturing Co., 395 W. Main St. Springfield, Ohio

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The Biddle & Smart Company
Amesbury, Massachusetts

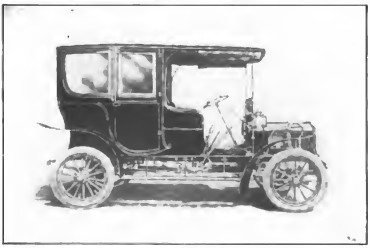
Limousine
Landaulettes

Side Entrance
and
Runabout Bodies



Delivery Wagons
and Trucks

Also
Artillery
Wheels



The most graceful and luxurious

LIMOUSINE

yet produced

Designed and built by the

New Haven Carriage Co.,
NEW HAVEN, CONN.

BYRNE-KINGSTON ©



TYPE K.C.

VERTICAL OUTLET.

A Practical Test

of the Kingston Carburetor, Type K. C. will convince Mr. Automobile man that we are not making claims for this particular *Carburetor* that cannot be substantiated. In order to more thoroughly introduce our *Type K. C.* we will allow a trial of *thirty days. Send* a trial of *thirty days. Send* and get one of them *and try it out.*

Kingston Spark Coils

are the most practical and durable on the market. They are constructed on the individual unit system—units are lock-corneted and hard-rubber capped.

Kingston Products

Carburetors, Coils, Mufflers, Pumps, Sight Feed Wheels, Spark Plugs and Timers are being adopted by manufacturers and supply houses, as fast as they become known.

Our various catalogs, describing in detail our products, will be sent on request.



DASH COIL.



Byrne, Kingston & Co.
120 Smith St.
KOKOMO, - IND.

If you wish to buy or sell a second hand car, see Motor Bureau, page 18.

Manufacturers! Owners!

☞ Write for our new Catalogue describing all the new features of our new style tops for 1906 cars. It contains just what you want to know.

Best Shapes

Features Newest



Best Materials

Lowest Prices

Springfield Auto Top & Upholstering Co.
102-106 Dwight St. Springfield, Mass.

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The Winner at the New York Shows

Col. Sprague's Auto Tops

In a Class by Themselves.
The Only Top Without a Wrinkle.

The Dealer's Choice
The People's Favorite





Col. Sprague

The Sprague Idea — Made the Sprague Way



A Little Bunch of Beauties In a Good Car With the Right Top.

See them at the Chicago Show if you want a Top.

"What is a Top?" *Send for our illustrated catalogue. If you don't care what you have, get any of the others. There is only one Sprague*

The Sprague Umbrella Co.

Norwalk, Ohio

Springfield Tops

Patented April, 1905—Others Pending

Aluminum Bodies



Six Bow Springfield Top

All Types of Tops for
All Makes of Cars.....

Springfield Metal Body Co.

30 Medford Avenue, Brightwood
SPRINGFIELD, MASS.

AMERICAN TOP CO.

AUTOMOBILE TOPS

LARGEST TOP FACTORY IN UNITED STATES

If you are looking for the highest grade Auto Top, we have it : :

Every variety but the CHEAP LEATHER-COVERED BOW SOCKET TOP.

AMERICAN TOP CO.
Jackson, Michigan

Capacity, 300 Tops per week

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RANDS MFG. CO.
MACOMB & BEAUBIEN STS.
DETROIT, MICH.
WHEELER MANUFACTURING COMPANY
TOPS FOR ANY MAKE OF CAR
500 TOPS PER WEEK
OUR PATENTED EXTENSION TOPS SEMI-LIMOUSINE AND CANOPY TOPS WITH CONCEALED BOW, WHEN NOT IN USE ARE HIGH CLASS
EXTENSION TOPS WITH OTHER SLATE IRON OR WOOD BOW CONSTRUCTION IF DESIRED

FINE HAND-FINISHED BODIES
RIVERSIDE BODY FACTORY BUFFALO N. Y.
Correspondence Solicited

TOPS BODIES
LATEST STYLES & PRICES ON APPLICATION
DETROIT MOTOR CAR SUPPLY CO.
DETROIT, MICH.

IF YOU NEED
a Top for your automobile, we can make it—any style automobile—at short notice. Material, price, and fit are O. K.
Eclipse Auto Top Co.
Ft. Wayne, Ind.

THE HIT OF THE SEASON
GABRIEL HORNS
work with foot lever from chauffeur's seat. Let us furnish you with estimate on Cape Top and Slip Covers.
Auto Cover and Top M'f'g Co., Inc.
Telephone, 4734 Columbus. 148 W. 56th St., N.Y.

AUTOMOBILE TOPS
SLIP COVERS
ENGINE COVERS
CAPE TOPS FROM $35 UP
Send for samples and agency proposition.
Auto Top and Equipment Co.,
1604 Broadway New York

Established 1873. Gape Lathes, Turret Engine Lathes and Shapers; Screw Cutting Foot and Power Lathes Hand and Power Planers, Hand and Power Drills, Chucks, Emery Wheels, Outfits, Tools especially for Blacksmiths' Electricians' and Bicycle work. Catalogues free.
SHEPARD LATHE CO.
141 W. 2d Street, Cincinnati, Ohio

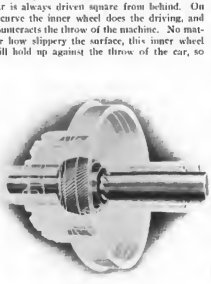
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324 326 Golden Gate Avenue, San Francisco, Cal.

AUTOMATIC
Lubrication is the only successful method of lubricating AUTOMOBILES. ALWAYS READY and never get out of ORDER.
21,000 IN USE
G. B. ESSEX BRASS CO.
DETROIT, MICH.

THE HEDGELAND AXLE.

THE Hedgeland axle, a novel device made by the Webster Manufacturing Company, of Chicago, exhibiting at the New York shows, is claimed by the inventor as a certain anti-skid. Mr. Hedgeland's claims are, in his own words, as follows: "Skidding is caused by the differential gear. When the driving wheels meet an unequal resistance there is a sudden transference of power to the wheel meeting the less resistance. This wheel is driven ahead at increased velocity and gives the car a side thrust and makes it skid. The same thing is true in rounding a curve. The differential gear, I believe to have been nothing better than a necessary evil, but it is no longer necessary.

"The Hedgland axle absolutely prevents skidding. It is a continuous shaft and it drives both wheels alike. In rounding a curve, when the outer wheel is called upon to exceed the speed of the inner wheel, it automatically disengages and runs free of the axle until the axle catches up with it, when it again engages. The car is always driven square from behind. On a curve the inner wheel does the driving, and countteracts the throw of the machine. No matter how slippery the surface, this inner wheel will hold up against the throw of the car, so



AN X-RAY ILLUSTRATION SHOWING ONE END OF HEDGELAND AXLE OPERATING IN HUB OF WHEEL.

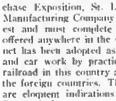
long as the clutch is kept in. The differential gear drives the wheel that is meeting the less resistance, which means that the wheel in difficulty quits work. But on the Hedgeland Axle neither wheel can quit work until it is running faster than the axle is driving it.

"The Hedgeland Axle always drives both wheels positively. None of the power is wasted by driving against the leverage and the friction of a set of gears. The axle drives squarely from the back and sends the car straight ahead. It makes no difference if one wheel is in a mudhole and the other on a greasy cobblestone, or if one wheel is in a snow-bank and the other on ice, the power is equally applied to both. With this axle a car will always coast when the motor is throttled. When the clutch is out everything behind it becomes idle, transmission, shaft and axle. This feature is extremely important to a car having the sliding gear transmission, because gears may be changed at full speed merely by throwing out the clutch, the gears engaging an idle shaft."

BARRETT JACKS.

THE Duff Manufacturing Company, Pittsburg, Pa., was awarded the Gold Medal, highest award, on the Barrett track and car jacks at the Lewis & Clark Exposition, Portland, Oregon. The Barrett jacks were also awarded the Gold Medal at the Louisiana Purchase Exposition, St. Louis, Mo. The Duff Manufacturing Company manufacture the largest and most complete line of lifting jacks offered anywhere in the world, and their product has been adopted as a standard for track and car work by practically every prominent railroad in this country as well as in many of the foreign countries. These two Gold Medals are eloquent indications of the worth of the Barrett jacks.

Do you use the Kirkham Auto Motive Power Equipment? If not you had better investigate them before closing for the season, as we deliver the goods. Capability and quality at the price you ought to pay.



1105 CUI shows our 18.22 h. p. 4 cylinder water cooled machine, weight as shown 765 lbs. We guarantee 25 B H P. maximum from every motor of this type.

Are you interested?

The Kirkham Motor Mfg. Co., Bath, N. Y.



WARNER DIFFERENTIALS
"A MECHANICAL MASTERPIECE"
Large Variety of Sizes and Styles
Both Sprocket and Bevel Drive
We will make any size or ratio of Bevel or Sprocket you want
Bearing Devices Absolutely Positive
Three Teeth Always Engaged
Bevel Drive Differential
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MOTORS AND PARTS AT THE SHOWS

AS is the case in other directions of motoring progress, that in the motor itself now has become almost fully a matter of detail refinement. More cylinders are cast in pairs than was the case at last year's show, but the individually-cast cylinder is by no means given up, and appears on many of the foremost cars.

One American foundry, the Manufacturers', of Bridgeport, Conn., at least, has gone into the production of the accepted cast-iron gasoline-motor cylinder in a very thorough manner, and shows examples of work that it is prepared to do for manufacturers, comparing favorably with the best work of the foreign foundries.

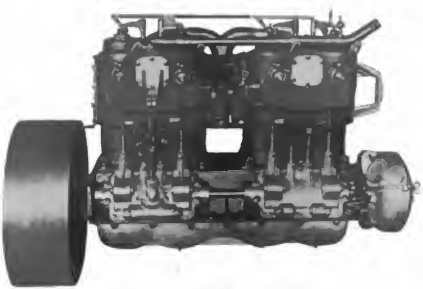
A greater lightness is attained by the use of better metal, temperatures that render it thoroughly fluid before pouring, and more particular molding and coring. Core holes have been lessened in number, though a few manufacturers still see fit to make them very large, closing them by aluminum plates that will give way if ice form in the water jackets, thus avoiding further damage.

The turned and bored cylinder is giving way to the cylinder finished by grinding, which affords a smoother wearing surface and an accuracy that is not affected by the distortion that always accompanies the use of a boring tool. Beveled inside walls, above and below the ends of the piston stroke, facilitate removal of the piston without any chance of the piston rings catching and breaking.

The symmetrical, or T-shaped cylinder, with inlet valve on one side and exhaust valve on the opposite side, persists in spite of its many objections. The argument for it by makers of some of the best cars is that it places all of the exhaust piping on one side of the engine and the inlet piping, carbureter, etc., on the other. Its chief objections—the increase in the proportion of combustion-wall area to combustion-chamber capacity, and the elimination of the cool incoming mixture from the heated exhaust chamber—show themselves in the continued construction of large numbers of motors with the valves side by side, on the same side of the cylinder. This arrangement also permits mechanical operation of all the valves from a single camshaft, and is otherwise desirable.

The inlet valve above the exhaust—a relic of the days when inlets were automatically operated by suction—is fast disappearing. A few very prominent makers utilize valves opening directly into the cylinder heads, operated either by an overhead camshaft, or by the usual rod, through rocker levers or tappets.

Air cooling has made a truly phenomenal advance, and many were the comments, both by the expert and the layman, on the thoroughly high quality of the cars shown embodying this principle in construction. The attached copper flanges of a few years ago have about disappeared, and their place has been taken by the integral cooling member, usually a plain flange cast as a part of the cylinder. Apparently it has been found expedient to sacrifice the greater heat conductivity of the copper for the perfect union between flange and cylinder that it is impossible to secure without an integral construction. The use of the fan for inducing a liberal cooling draft with air-cooled cars rarely is dispensed with now, its use being found advisable even for the smallest and lowest-priced car. Four-cylinder cars, of standard type—with the cylinders under the hood—are numerous.



MOTOR OF THE COLUMBIA, MARK XLVII.

Water cooling has undergone no material modifications. A tendency to pump the cool water into the jackets immediately above the exhaust valves, where the most cooling is required, and to take the hot water out from the center of the cylinder heads, so that its egress is facilitated by thermosyphon action, is very obvious from an inspection of the better-designed cars. The cellular radiator no more than holds its own, numbers of prominent designers holding to the use of finned tubes; arranged, however, into a radiator having the general form that was introduced by the advocates of the "honeycomb." Circulating pumps in almost all cases are provided. There is, perhaps, an increase in the number of rotary gear pumps over those of the centrifugal pattern.

The advent of the automatic cranking device is a feature of this year's shows. Some of the best of these take the form of a spiral spring, coiled in a drum that gears directly through the forward end of the motor shaft. The spring can be wound up either by a crank—geared low to wind easily—or by connection with the motor. Once wound, the spring is capable of turning the motor over four or five times—usually enough to avoid resort to the crank. Another automatic cranking device of considerable complication, none of which, however, need interfere with operation of the car by the ordinary method, if desired, involves a complete compressed-air plant, including a storage reservoir and a three-cylinder air compressor, which can be used as a compressed-air motor. Energy is stored by throwing the compressor into engagement with the motor, whereupon the tank is pumped full of air. To start the motor, admission of air from the tank into the compressor runs it as a motor, it being now arranged to turn over the motor.

A new self-starting device, introduced by a prominent foreign concern, is very novel, it consisting practically of a surface carbureter on the dashboard, whence a rather rich mixture can be forced—through means of a small hand pump and suitable valves—into the combustion chambers of such cylinders as happen to be standing on the working stroke. This done, switching on the ignition suffices to set things going.



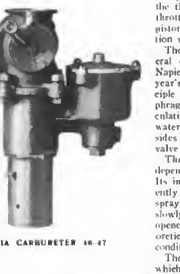
MOTOR OF THE ENGLISH DAIMLER

CARBURETERS AT THE SHOWS.

NEARLY all the carbureters seen at the show belong in one of two broad classes. In the first class are carbureters in which an auxiliary air supply, so directed as not to take up gasoline from the spray nozzle, is controlled by direct connection to the throttle, so that when the throttle is opened the auxiliary inlet is increased, and *vice versa*. A modified arrangement is to leave the air inlet constant, but to cause a needle valve or the

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like to act on the spray nozzle to restrict the opening of the latter when the throttle is opened. In still others this needle valve control is combined with regulation of the air inlet. In all, however, there is a definite relation between either the air inlet or the



COLUMBIA CARBURETER 46-47

spray nozzle opening and the opening of the throttle.

In the second class of carburetors there is no such definite relation, but the opening of the auxiliary inlet is determined by the degree of vacuum in the mixing chamber, independently of the position of the throttle. In carbureters of this description the argument is that when the motor turns slowly, as when hill climbing, the air velocity and the vacuum may be low when the throttle is wide open, and that under such conditions it is not desirable to open the auxiliary air inlet, which produces a weak mixture at the very time when a slightly rich mixture is to be preferred. Although the former type of carburetter is not quite so perfect in theory, it seems to be easier to produce, and is found in a large number of cars, including among others the Mercedes, Pope-Toledo, S. & M. Simplex, Rochet-Schneider, Fiat, Buick, Franklin, Elmore, etc.

Among cars having carbureters of the second or automatic type properly so-called, are the Panhard, C. G. V., Peugeot, Napier, Clement Bayard, Locomobile, Columbia, Packard, Peerless, Brasier, and those using the Kingston, Holley, Schebler, etc.

The Franklin carburetor is partly shown in the accompanying section. An air by-pass, not shown, is cored into the body of the carburetor and communicates with the spray chamber below and above. It is closed by a butterfly valve connected to the throttle, and is opened in proportion to the opening of the latter.

The Columbia carburetter, which is new, is rather elaborate. It comprises a float chamber, a chamber below the mixing chamber, through which air enters through slots in a shutter normally closed but lifted by suction of the engine to open the slots more or less; a spray chamber, a mixing chamber, with the principal throttle valve just above it, and an auxiliary throttle in a separate chamber connected as a by-pass above and below the principal throttle. The governor acts only on the air by-pass valve, and the principal throttle is governed by the accelerator pedal. The governor throttle valve is controlled also by a lever on the steering column, and the effect of the whole arrangement is that when the principal throttle is closed and the by-pass valve opened by hand as far as possible, the car has a speed of about 20 miles per hour in high gear. This can be reduced as much as desired by shifting the hand lever to allow the governor to act sooner.

The carbureter of the Northern has a light fibre disk below the spray nozzle and surrounding the latter, by which it is guided. It has holes drilled through it in sufficient number to pass enough air for the slowest speeds, and as the motor speed increases this disk rises a little and permits the air to pass around its edges, an annular recess being cast in the wall of the carburetor for this purpose. A stop is provided to keep it from rising too far.

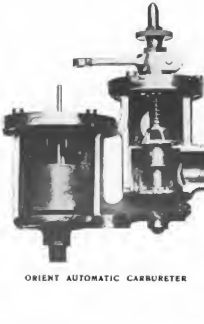
The Locomobile carbureter is the same as last year, except that the air port into which the throttle leads is cored out all around the throttle, so that the latter, which is of the piston variety, cannot stick from the air suction when it is nearly closed.

The Oldsmobile, Cadillac, Autocar, and several others use the Holley carbureter. The Napier carbureter is slightly changed from last year's form, but still uses the hydraulic principle of governing, by which a rubber diaphragm is connected to the outlet of the circulating pump and the varying pressure of the water opens or closes a throttle valve. Besides this there is an independent throttle valve which may be closed by the operator.

The carbureter of the C. G. V. has two independent spray nozzles and spray chambers. Its interior could not be explored, but apparently the air passes only through the smaller spray chamber when the motor is running slowly, and as the speed increases a port is opened to the larger spray chamber, thus theoretically maintaining approximate constant conditions of action under varying conditions.

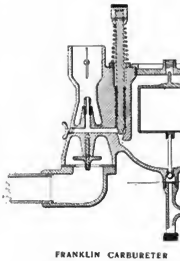
The Clement Bayard has but one air inlet, which is at the top of a substantial-looking standpipe cast in one piece with the body of the carbureter, and connected with the latter at the bottom. The throttle is a butterfly valve above the mixing chamber, and is actuated in the ordinary manner. The air inlet, however, is governed in a rather unusual manner by a combination of two flap valves in the standpipe. The annexed diagram will give the idea. *A* is the barrel of the standpipe and *B* is the spray nozzle. *C* is a wire gauze screen over the mouth of the standpipe, and the two flap valves are indicated by *D* and *E*. The stems on which these valves pivot are connected by the links and levers shown in the dotted lines, so that the valves open and close together, the directions of their movements being opposite. A very light spring *F* tends to close them. It is a little difficult to say why two valves are used instead of one, but probably it is partly to neutralize the effect of the intrush of air in distributing the valve opening. Of course *H* this were completely neutralized the valves would not open at all, but if the valve *D* acted alone it would require a much stiffer spring to prevent it from opening to an undesirable extent.

The new Peugeot carburetter is shown diagrammatically in another illustration. The float chamber, which is not in the plane of the drawing, delivers the gasoline to the base of the standpipe *A*, which is a brass tube closed at the top, and having a small horizontal slit in



ORIENT AUTOMATIC CARBURETER

one side. This tube and slit are partly covered by the sleeve *B*, whose lower end has a V-shaped notch in it, as shown in the detail below the carbureter in the sketch. The air enters by two inlets, one, *C*, which is constant, and another, *D*, which is controlled by a rotat-



FRANKLIN CARBURETER

able shutter *E*. The entire air stream passes through or around a thin brass valve disk *F*, which has holes drilled in it and is attached to a stem whose other end carries a light brass plunger *G*, which works in a cylinder serving the function of an air dashpot. By means of the nut on the end of this stem the tension of the spring *H* may be adjusted. *F* is shown slightly lifted by the air current. The principal throttle is at *I*. It is shown nearly open, and is closed by moving to the left. It is connected through the links and levers shown diagrammatically by the heavy black lines to the stem *J*, by which the sleeve *B* is operated. The action is such that a closing movement of the throttle pushes *B* downward and thus cuts off the ends of the gasoline slit. The carbureter is water jacketed at *K*.

The new Peerless carbureter is decidedly novel and interesting. It has a rather complex throttling device, the object of which may be either to commingle the gasoline and air more thoroughly, by giving them a tortuous passage to traverse when the throttle is nearly closed, or to make the throttle very sensitive by requiring but a small movement to open it fully.

In the sketch the gasoline enters by the pipe *A* and passes into the float chamber by the holes *BB*, drilled in the plug in which the needle valve *C* seats. The needle stem is quite large and heavy, and seats itself by its own weight. The principal air stream enters by a shutter *D* and passes straight upward past the spray nozzle *E*, where it is joined, if the engine speed be high, by a supplemental stream from the light automatic valve *F*. The throttle valve is an annular casting, having a conical end with a number of slots *GG* in it. When the valve is nearly closed all the air for the motor must pass through these slots, and through the central passage *H* and the narrow opening *I* at the right hand end. When, however, the throttle is opened wider the carbureted stream has an additional direct passage around the conical portion of the valve.

The most striking novelty observed in carbureters was the Newcomb. This device has no float, and the gasoline coming from the tank passes through a lift needle valve into a shallow circular chamber above a flexible diaphragm of oiled canvas. Attached to the center of the diaphragm is a short vertical tube, which establishes communication between the air space above the gasoline and the mixing chamber, which the air enters from the top, against the extension of the valve just noted. A partition separates the mixing chamber from the space below the diaphragm, which is in

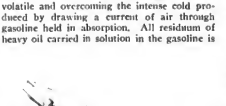
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communication with the outside air. Thus an increase of suction raises the diaphragm and needle valve, admitting more gasoline. From the upper diaphragm chamber the gasoline overflows through the central tube and runs down upon a central cone in the mixing chamber, which the air enters from the top. The completed mixture passes out below. The carbureter is primed by lifting the gasoline valve, by pushing up on the central stem which carries the cone. Exceptional efficiency and uniformity of mixture is claimed for this carburetter by its makers, the Newcomb Carbureter Co.

The American Generator Co's product is perhaps the most remarkable innovation in the motor-car industry that was on exhibition in the shows.

It is in effect a small, but very efficient, gas plant, taking the place of a gasoline tank and carbureter on a motor-car or motor-boat. The tank cannot be exploded, holes may be punched into it without in any way affecting the running of the motor, as the gasoline cannot escape. The tank is packed solidly with an absorbent material which absorbs the gasoline rapidly, requiring a little more time to fill than the ordinary tank, all excess being drawn off through a cock in the bottom. This packing makes it impossible for any fluid to leak through openings in the tank, as there is absolutely no fluid in the tank.

Heat is taken from the exhaust pipes and passed through a radiator passing through the centre of the tank, making the gasoline very volatile and overcoming the intense cold produced by drawing a current of air through gasoline held in absorption. All residuum of heavy oil carried in solution in the gasoline is



LOCOMOBILE CARBURETER.

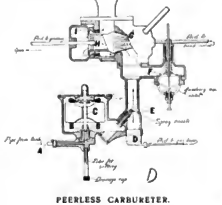
distilled and formed into gas by a simple device inside the tank. By these means the two great difficulties that have heretofore prevented the attainment of the result reached, that is, the intense refrigeration and clogging of the tank packing by foreign substance, are overcome and the tank lasts indefinitely.

The tank furnishes a large and constant supply of pure, dry heated gas which passes to a specially designed mixing valve and regulator, where it receives its air and becomes an explosive mixture passing from the regulator direct to the intake valves. There can be no clogging of pipes or openings, as the entire piping system and connections are large, in no place less than one inch in diameter.

A fire test made with the device, with holes punched in the tank and fire applied to the holes was without any bad results. The motor ran at high speed and low speed while the holes were still open, with not the slightest escape of gasoline.

BEARINGS AT THE SHOWS.

THERE is room for little doubt about the type of automobile bearing that is to be the bearing of the future. The ball bearing is almost the bearing of the present, and with the improvement of a year or so more bids fair to become universal. Ball bearings of the European, non-adjustable type are responsible for the change, it seeming to be a demonstrated fact that the bicycle type of bearing, adjustable, and of American origin, does not meet the demands of heavy service.

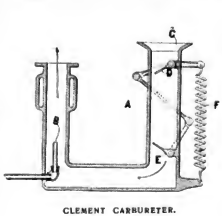


PEERLESS CARBURETER.

Considerable discussion and much misconception still beclouds the understanding of many otherwise well-informed engineers concerning this sort of bearing. The facts seem to be, however, that a ball bearing can endure under heavy service only if it be marvelously accurate—accurate beyond the accuracy required in most other mechanisms. This being the case, it follows that a ball bearing worn enough to require adjustment is reasonably to be considered fit for no further use under any conditions, for the simple reason that wear never is even, and impairs the bearing surfaces beyond any possibility of correct readjustment. And since it is found that a properly-designed ball bearing—made of the right quality of steel, uniformly tempered throughout, instead of merely case-hardened, and ground to surfaces of the utmost accuracy—is capable of a truly extraordinary amount of running, without the least apparent impairment of the balls or wearing surfaces, the supposed desirability of adjusting means ceases to exist. That these theories work out as well in practice as they do in the telling, seems proved by facts of use that are not to be evaded. A majority of foreign cars have used bearings of this general type for years—in wheels, change-speed gears, and even on motor main shafts—with hardly a recorded instance of broken balls or material wear.

Several manufacturers who had ears at the shows equipped them with ball bearing crank shafts, and many of them used ball bearings throughout other portions of the mechanism, while American manufacturers of bearings are catering to the new demand in a manner that signifies entire conversion.

The lubrication of motor-car bearings is a very simple matter in cases where balls are employed, but with plain bearings elaborate automatic systems seem to give the best satisfaction. Force-feed lubricators have generally displaced gravity systems, and each individual lead to each bearing is independently fed, in the best designs. One American lubricator that gives very good results has a disk-like

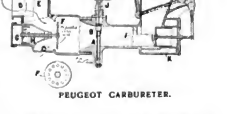


CLEMENT CARBURETER.

rotating member in the bottom of the oil reservoir, with a hole opening through one edge of it into any one of a plurality of leads that open beneath it, according to the point in rotation. As a hole in the disk aligns with any one of the others, a small spring-actuated plunger pump automatically shoots a measured quantity of oil to the bearing. The quantity to each lead can be independently and very closely adjusted, by means of a small screw. The whole apparatus is driven by belt, gearing, or frictional contact, from any convenient moving part of the mechanism.

At the shows last year the most unmistakable sign of the times was the impending predominance of the ball bearing. Today these sapient observers who then predicted that within twelve months the majority of American cars of note would use ball bearings of the annular two point type, better known as the Hess-Bright, in transmission gears, wheels, and rear axle, can point with pride to prognostications more than fulfilled. The expansion of the use of these ball bearings has been most startling. Apparently it has taken even their makers by surprise, for several motor-car makers whose cars now have plain bearings, roller bearings, or adjustable ball bearings, admitted on being questioned that their selection was a case of "Hobson's choice," as they were unable to get delivery of the ball bearings they wanted sufficiently early to warrant them in placing orders. However that may be, most motorists of experience will be likely to consider a reasonable amount of delay worth while.

The De Dietrich, Panhard, and other French



PEUGEOT CARBURETER.

'06 cars have a new form of ball bearing, annular and non-adjustable, like the other, but with shallower grooves in the races and neither separating spring nor notch for inserting the balls. The latter are simply forced into the grooves by springing the rings out of shape, and, once in, they never come out. To look at the assembled bearing, the feat seems simply impossible, even by permanently deforming the rings, since the races are completely filled with balls, save for a total spacing of about 3/32 inch. Nevertheless, the balls are there and the rings do not turn as if they were out of round. This bearing bears the letters "R. B. F.," and is made by Lemoine, of Paris. It is used also in the Peerless throughout the transmission and in the wheels.

In the Pope-Toledo a combination of plain and ball bearings is employed, the latter being of the 4-point type, and several of them being located together where extra load is to be sustained.

Among other forms of anti-friction bearings noted were American roller bearings on the transmission gear shafts of the Apperson and Haynes cars, Timken bearings in the rear axle and on the bevel pinion shaft of the new four-cylinder sliding gear Olds, and Hyatt roller bearings in the rear axle and transmission gear case of the Autocar and the rear axle of the Oneen.

STARTING DEVICES AT THE SHOWS.

ONE of the most interesting novelties of the Richard-Brasier cars of the 1906 model is the arrangement by means of which the vehicle is started from the driver's

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seat. It is not here a question of an automatic starter, for that name can be applied only to an arrangement in which is stored up the energy necessary for the work represented by the starting of the motor. Here we have no accumulation of energy. It is always the energy of one's muscles that acts upon the crank and pistons, although this may be utilized in two different ways, as may be desired, viz., through the crank in front of the car, according to the old method, or through a lever from the car seat, according to the new one.

If it be desired to use the old method, the driver pulls the lever *m*, which, through the fork *n*, pushes the free wheel *P*, which is provided with teeth, against the cog *A*, which is keyed upon the crank. Then the crank *M* is revolved.

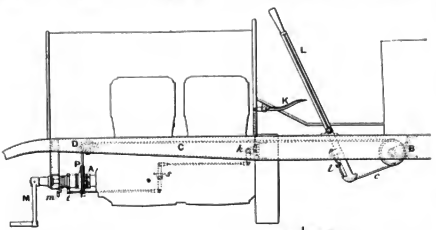
If it is desired to use the new arrangement, the driver presses the pedal *K*, which, through the fork *t*, effects the engagement of the teeth. Then he pulls the lever *L*, which, through a cable on the pulleys *BD*, actuates the free wheel *P*, and, consequently the cog *A*. The two and four-cylinder motors are now so easy to start that a simple movement of the hand lever is sufficient to effect the object. The crank in front, so dirty in wet weather and so dangerous to the driver, and so ugly withal, can be detached and put into the tool box to await its transfer to the receptable for other old accessories.

The "Ever Ready" Automatic Starters, made by the Auto Improvement Co., New York, are designed to automatically start any gasoline car and are thrown into operation by a small release pedal, and after starting the motor, it is automatically rewound by the motor as soon as the same has acquired a sufficient speed, and when fully wound up it is automatically disengaged. This rewinding and releasing is accomplished in a few seconds, and is entirely automatic.

After the starter is fully wound up, it may stand for any length of time, being ready at any moment to be thrown into operation for the purpose of starting the motor.

DESCRIPTION.

A—Outside steel shell or casing.
B—Extension of engine shaft.
C—Coupling to allow for flexible connection.
D—Starting clutch lever connected with pedal release lever.
E—Section of starter spring.
F—Break or starting clutch disk head and band.
G—Cycloidical reducing gears.
H—Starting ratchet secured to starting shaft.



RICHARD BRASIER STARTING DEVICE.

I—Starting pawl secured to break or clutch head.
J—Internal gear and ratchet, through which the spring is rewound.
K—Centrifugal or rewinding clutch.
L—Centrifugal rewinding dogs which engage the centrifugal clutch.
M—External member of centrifugal clutch.
N—Front view of starter.
O—Holes for releasing pins.
P—Centrifugal clutch spring.

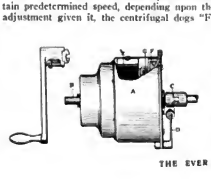
OPERATION.

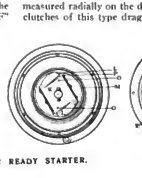
The spring being once wound up, the motor is started by pressing the foot pedal, which, through its connections with the clutch lever "D," serves to release the clutch band of the disk or head "F," which permits of the rotation of this disk head and engagement with the motor shaft through the starting ratchet "H" for the purpose of starting the motor.

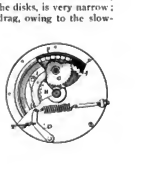
The inner end of the tightly wound spring "E" is connected by the locking pawls and ratchet "J," and the connection with the starting ratchet "H" is accomplished automatically by the act of rotation of the disk head "F," and hence through this means the full power of the spring is thrown on to the motor shaft to start the motor.

When the motor shaft has acquired a certain predetermined speed, depending upon the adjustment given it, the centrifugal dogs "F" are thrown out into engagement with the external member "M," of the centrifugal rewinding clutch, which in turn is connected with the pinion gear of the gearing system, which has a reduction of 10 to 1 between it and the spring arbor, hence in rewinding the spring only one-tenth as much effort is required as would be developed in starting the motor itself, or as would be required to crank the motor direct; therefore, in cases where the starter has been run down without starting the engine as would happen in case of spark failure, carbureter trouble, or in case the switch lever was left open, then resort can be had to the crank, but in a new way, as it is made so that it can be engaged with the clutch member "M" to rewind this spring through the 10 to 1 reduction of gearing, which makes the task an easy one, that any child or woman can perform, and protects them against any dangers of back kicks, etc. Once the starter is rewound by this means it can be tripped off again by the pedal release lever just the same as if it were rewound automatically. Should one, for any reason, however, desire to crank the motor in a direct manner in the usual way, one may do so, as it is provided with a telescoping head which can be set so as to engage directly with the motor shaft and start in that manner just as though the starters were not present.

When the starter is rewound automatically by the motor a set of cam-shaped pins are pushed forward and into the holes "O" which draw the winding dogs "L" out of engagement to the clutch member "M" and thus disconnects the motor from the starter when the spring has been rewound a certain definite number of turns. The operation of these cam-shaped pins is effected by a screw actuated release mechanism, but it is again thrown into operation should the starter only be run down one turn for the purpose of starting the motor; hence this automatic means always insures the starter being fully wound up.







THE EVER READY STARTER.

CLUTCHES AT THE SHOWS.

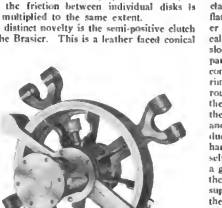
ALTHOUGH the conical leather faced flywheel clutch is still used in the majority of cars, especially cars of low to medium power, in which its inertia is not a troublesome matter when changing gears, the metal to metal clutch is making distinct gains. In this class of clutches the multiple disk clutch appears to be the favorite, though there are various special instances of other types being used. The Rochet-Schneider, for example, has an expanding ring clutch, and the Thomas has three disks of large diameter forced together by large radial dogs actuated by a spring and cone on the shaft. The Mercedes still uses the wind-up spring clutch associated with it for the past three years, and the Haynes has a contracting band clutch of special design. The new Peerless has an expanding ring clutch, which is quite similar to the Packard in the mode of its operation. The Martini alone, among cars using the expanding metal clutch last year, has gone back to the leather faced cone. In the Berliet is a pair of semicircular shoes forced apart by a wedge.

Multiple disk clutches are found, among others, on the Fiat, Panhard, Clement Bayard, Stevens Duryea, Buick, Maxwell-Briscoe, Welch, and Franklin. It was learned that the experience of the Panhard and Fiat builders has been that unless the width of contact, measured radially on the disks, is very narrow; clutches of this type drag, owing to the slow-

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ness with which the oil works between them on release. Consequently in these two cars the width of bearing surface is not more than ½ inch or 5/16 inch, and in the Fiat at least the edges of alternate disks are cut and bent to form separating springs, which assist the clutch to let go. This, by the way, is the arrangement used in the Maxwell-Briscoe also. Owing to the large number of disks employed in these cars—from fifty to sixty—it is evident that any dragging at all would be fatal to satisfactory performance. The majority of American multiple disk clutches have a much wider contact face and their successful operation may perhaps be accounted for by the fact that the number employed is smaller, so that the friction between individual disks is not multiplied to the same extent.

A distinct novelty is the semi-positive clutch of the Brasier. This is a leather faced conical



HAYNES' MASTER CLUTCH.

clutch which carries a number—four or six—of spring-pressed plunger pins, which when the clutch is at rest slip into holes drilled to receive them in the flywheel web. While the clutch is taking hold these pins do not engage, owing, it may be supposed, to the rapidity of the relative motion between flywheel and clutch, but as the clutch progressively takes hold they go in and give the clutch a positive drive until released.

The new Autocar has a three-plate disk clutch somewhat similar to the Thomas, but engaged by mechanism of quite different character. Two of the disks are of pressed steel, one of which is bolted to a three-armed spider which in the smaller car is likewise of pressed steel, and in the larger car is a casting. The other plate is guided by the spider in such a manner that no relative rotation can take place. Between these is a bronze ring or disk of diameter greater than the steel disks and having notches which engage suitable internal projections in the flywheel rim. This disk is drilled through with a number of holes which are filled with slightly projecting cork plugs. The spider is keyed on the first gear shaft, which projects sufficiently for this purpose, and the second or floating steel disk is forced against the other by a system of three toggle arms, actuated by a sliding collar on the shaft, and small bell-crank levers connected to the toggles and pivoted to lugs on the spider. When the three toggle arms are straightened, the bell crank arms, which have adjustable set screws in their ends, force the three disks together. The initial friction between them is that of the cork plugs, but the final grip is metal to metal when the cork has been compressed. This clutch is engaged by the pawl of a helical tension spring attached to the frame, and acting through the thrust collar by a yoke of the usual sort. When the toggle arms have been straightened there is no necessity for further pressure on them, and the spring is therefore arrested by a stop at this point; when the clutch is properly adjusted there is no end thrust after engagement is complete. This spring in the four-cylinder car acts through a second toggle joint to increase the pressure, this toggle joint being located between the spring and the rock shaft carrying the yoke which acts on the thrust collar.

The clutch of the new four-cylinder Northern is operated by compressed air from a pump mounted on the motor. The air from this pump is carried through a controlling valve and copper pipe to a stuffing box at the front end of the crankshaft, from which it passes by holes drilled clear through the crankshaft to the rear end. The flywheel has a large drum enclosing the clutch, and between the drum and the rim are cast fan-blade spokes. In this drum are two cast-iron disks, one forming a portion of the flywheel web and the other bolted in place like a follower plate. Next to the web is a disk of chrome leather clamped tightly at its edges by an annular flange on the second disk. Between the leather disk and the follower plate, as it may be called, is a large steel disk forged with a large slotted hub, this being the slot which forms part of the slip joint mentioned elsewhere in connection with the transmission. An annular rim cast on the back of the follower plate surrounds this hub and helps to retain oil. When the air is admitted to the crank shaft it forces the leather disk against the loose steel disk, and the latter against the follower plate, producing a grip which is powerful without being harsh, and the pressure of which is entirely self-contained. Oil or thin grease is fed by a grease cup, and before the surfaces can grip the oil must be squeezed out. Should the air supply fail, the first effect would be to release the clutch and permit the car to stop even without the emergency brake.

The clutch of the Knox car is roughly shown in the sketch herewith. *A* is the crank shaft of the motor and *B* the flywheel rim, to which is bolted a disk *C* having an internal conical flange which acts as one of the surfaces of the clutch. The end of the crank shaft has a bearing (seen dotted) in the main driving shaft *D*, whose end near the clutch carries four flutes or grooves, on which is loosely fitted a sleeve *E*, threaded at its rear end and flanged at the other end to carry the four-armed aluminum spider *F* of the clutch. This is faced with a band of steel and is coned to a very slight angle. A considerable quantity of oil may be carried in the space *G*, and will be prevented by centrifugal force from escaping when the clutch revolves. Grooves are

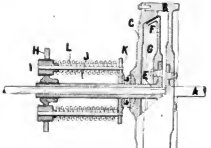


FRANKLIN CLUTCH.

provided in the flange of *C* to permit the oil to work freely to the clutch surfaces.

On the rear end of *E* is threaded a bronze flange *H*, which is drilled and tapped for four bronze bushings *I*. Each of these bushing is drilled to receive the end of a stud *J*, whose other end is fixed in a disk *K*, which bears through a ball thrust collar against *C*. *L* is a helical spring, made by milling a spiral slit in a steel tube. These springs are adjusted by the bushings *I*, and they serve to draw the clutch into engagement. To release the clutch the customary rocking yoke bears against a loose sleeve (not shown) which abuts against the end of *E*. The function of the disk *H*, aside from serving as a carrier for the bushings *I*, is to act as a brake to check the momentum of the clutch when it is desired to change into a higher gear. For this purpose a mating disk (not shown) faced with leather is mounted on the frame just in front of *H*, which is pressed into contact with it when the clutch is released. It is of course to be supposed that the operator will avoid pushing the clutch so far as to render *H* active when he desires to gear down.

A novelty in clutch and brake operating mechanism is shown in the Elmore. The clutch is a split bronze ring expanding against a drum, and operated by a spreading cam, lever, and sliding thimble. The spring is helical, external, and connected in tension between the clutch pedal and a sort of toggle on an arm rising from the rock shaft connected to the hand brake lever. This lever has a latch which drops into a notch at the back of the sector, and the rest of the sector is plain till the middle is reached, beyond which the brakes begin to take hold. When the brake



KNOX CLUTCH.

lever is unlatched and pushed forward it first slackens the clutch spring, but without releasing the clutch, and then tightens the brakes. Thus the motor may be throttled to assist the brakes. If now the clutch be released it will be re-engaged when the spring is tightened by pulling the brake lever back, unless it is held out by pressure on the clutch pedal.

RUNNING GEARS AT THE SHOW.

As regards the running gears of the foreign cars, it may be said that the tendency as to lengthening the springs has not yet quite found its limit. Springs are not only longer, but wider than formerly, and in the majority of cases are provided with clips of one sort or another to prevent the leaves from opening on the rebound. Several makers have adopted or approached the length of (about) 56 inches for the rear springs, set by the 1905 Mercedes, and short springs have practically disappeared. A striking departure from usual practice was noted in the Viuqeot. The front springs of this car are about 55 inches long and have twelve leaves, as against about 53 inches, and eight leaves, for the rear springs. This unusual arrangement was claimed by the exhibitor to give the car greatly improved riding qualities, and to prevent the front end of it from pitching on a rough road.

Many of the longer semi-elliptic springs seen were "decentred," or made shorter at one end than the other. This is claimed by some to improve their riding qualities, but the main reason for it is certainly to avoid long projecting spring hangers at front and rear.

The platform spring, which for a year or two recently found almost its only representation in the C. G. V. car, is now apparently returning to favor, and was observed also on the Peerless, Rochet-Schneider, Delaunay-Belleville, Renault, Spyker and Martini. Full elliptics were found on the Ford, Columbia, Franklin, Reo, Marion, Mitchell and Welch. The Brasier and Cadillac have three-quarter elliptics in the rear.

Possibly the increasing use of shock absorbers has something to do with the fitting of these flexible forms of spring, as calculated to dispense with the need for such assistance.

(*Continued on page 181.*)

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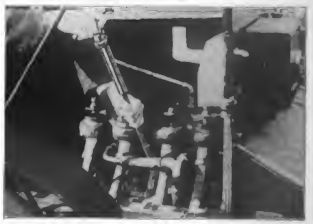
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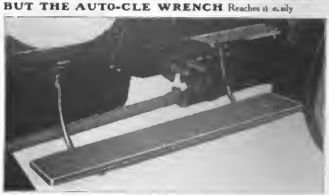
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The Lee AUTOMOBILE SPECIALTIES

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Full equipment and capacity for completing large contracts promptly. We have made steam goods for 20 YEARS—no experiment in intrusting your work to us. Last season we made parts for some of the largest motor car makers, and this season will do much more. Accurate work only. Send blue print, stating your wants and get estimate. Correspondence solicited. Special Gear Cutting.

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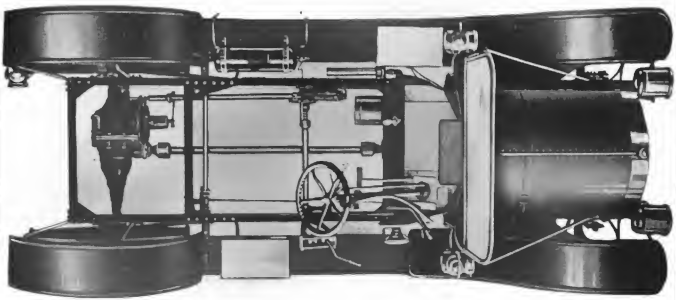
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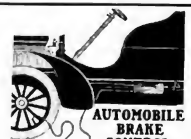
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operated by a touch; uses only **spent** power; simple, compact and easily attached.

Attached to the cylinder which operates the brake is a chime whistle; also a tire filler. Price, complete, ready to attach to any car, $50.00. Booklet with complete description free on request.

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For Automobiles and Motor Boats

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Investigate this. It is positively the best cooler on the market to-day. Does wonderful work. Great strength and durability. Won't clog up. Won't leak. If damaged by accident, broken tubes can easily be replaced. Write us.

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For tanks with or without pressure, to show quantity of gasoline. Simple, reliable and of superior workmanship.

The "Triumph" Gasolene Tank Gage has been adopted as part of the regular equipment of all "Pierce Great Arrow" Cars for the season of 1906.

See that your new car has a "TRIUMPH" GAGE

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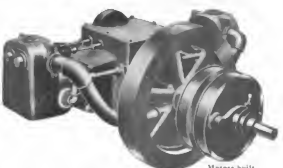


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¶ The increased evidence of both our honeycomb and tubular radiators on 1906 cars proves their worth.

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We make, Both Honeycomb and Tubular RADIATORS, Iron and Aluminum HOODS and FENDERS, Sheet Metal DECK BOXES, SEATS and MUFFLERS, Ornamental HOOD FRONTS for air-cooled cars, Galvanized Iron and Copper Gasoline and Water TANKS, Plain and Ball-Bearing DISC FANS, Concave Sheet Metal DASHES

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There is no question about BrennanMotors

WHEN you buy another kind of motor the inevitable question is sure to rise in your mind—Will it do what is claimed for it? But there's no question about

BRENNAN MOTORS

They are standard the world over—always ready always do what we say they will

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Very truly yours,
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We make special Motors and Transmission Gears for Oldsmobiles, Northern Runabout, Olds Touring Cars, Cadillac, Ford, Thomas Model 17 and 18, General, Yale, Autocar, White steam cars, Glide, Rambler, Cleveland, Grout, Pope Hartford, Sandusky Runabout, St. Louis Runabout, Marr and all standard makes of cars. Special motor and transmission for commercial cars.

WHY DO YOU SELL IT?

Why do you sell your car?

Generally because it has not power enough and you want one that can go faster or has power enough to climb hills easier.

WHY DO YOU SELL IT?

When by merely attaching one of our gasolene tanks or more properly gas producers, you can get all the added power and speed you want, and in a short time save the cost of the outfit by having the cost of your fuel cut down one-half.

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It is a simple matter to lift a motor from a machine with this hoist

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The CARRICO Engine will have all the latest and best ideas of the designer, F. D. Carrico, who has nine years' experience in the building and designing of successful engines and automobiles, and has to his credit two of the most perfect air-cooled engines being built to-day. The CARRICO Engine is his latest creation and will be built as nearly perfect as modern grinding machines and special tools and jigs can make it.

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SPEED CHANGING PULLEY CO.

Indianapolis, Indiana

WE EXHIBIT AT CHICAGO

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Correct Motor Raiment

By Joel Feder

Latest Winter Ideas in Motor Apparel—New Fur Garments of Distinctive Line—Astrakhan Is a Favorite—Natural Seal Elegant and Serviceable—Fur Lined coats with Detachable Collars—Colors in These Supercede Black—Cap With Detachable Chiffon Veil—Cloth Coats for the Southward Boud—A Daring Style in Leather—The Latest Mask Goggles from France

THE weather has been especially kind to the devotees of the motor-car this season, and the long continued fine driving season seems to have acted as a fillip and tonic to the ideas of the designers of motoring apparel, so that now, in midwinter, we find many new ideas, many shapes and fabrics, and novelties altogether foreign to the styles of the early fall.

The motorist—feminine or masculine—may be unhesitatingly classed as a fur-wearing animal this winter. Fur, either as the entire garment or as its lining or trimming, is a present "motor-fashion-rule" that has few exceptions. Furs this season, be it known, have taken on certain new qualities, have grown softer and suppler, until that universally used adjective "chiffon" may be almost applied to them. This very soft and pliable quality of the pelts, together with the careful work of the designers of motor apparel, gives us fur garments of grace and beauty that embody both the practical and the artistic. Women, and more particularly American women, have strenuously refused to masquerade as an Esquimo or a member of a Peary Expedition, even for the sake of her beloved "bubbling." The fur garment may be all enveloping and still be a thing of graceful lines; the fur cap may be becoming and a protection as well.



From Saks & Co.

FASHIONABLE STRIPES AND CHECKS APPEAR IN MOTORING GARB

The strong revival of astrakhan in general fashions this winter finds emphasis in motoring apparel. This skin is quite durable, and the better grades of it have the close silk wave of broadtail. Creamy white caracul is frequently used for collar and cuffs or astrakhan coats, caracul being about the only white fur that is considered correct style for motor-car wear. Natural seal is another candidate for favor in the motor field. It has a certain richness and a claim to durable qualities, that make it attractive to the discriminating.

A style that can be used for more than one purpose is always sure to find favor. Such are the fur-lined coats with huge, fur collars, either attached or detachable, which may serve satisfactorily as carriage coats, or overcoats, as well as for motoring wear. When the collar is attached, it is usually of medium size; when a large collar is desired, one to thoroughly protect the ears, it is often made detachable.

The colors used in these cloth coats are along the darkest of the rich shadings of the winter color card. The plums, the deep dahlias, and the darkest wines are not only fashionable but most becoming as well, which accounts for their having to so great an extent superseded black for cloth garments.

Fur-cloths, such as mole-cloth and persiana, are made up exactly the same as are the genuine skins, and, indeed, are often difficult to distinguish from the real article. Long-haired furs are used to trim those fur-cloths, black lynx on persiana being an effective combination.

There is a smart coat which is made of brimmer, cut in three-quarter length, flared to a small bell effect, and fastened in front with huge pearl buttons. The collar, though large, is not an exaggerated affair, and the coat is well adapted to walking or driving purposes on stormy days.

Many handsome effects in caracul are worn by the fashionable devotees of the car. In certain shades, notably a soft, rich "spaniel" brown, this fur is delightful. A model lately shown in Paris was of this shade. It was cut on Empire lines and apparently fastened on either side of the front, little tabs of the fur extending from under a wide box pleat, and fastening through dull gold buckles. With this was a charming cap to match, constructed so as to admit of graceful draping of a double-chiffon veil. The veil is inserted in a little band of fur which holds it securely in place without pinning—a point which the fair motorist considers a wise provision, since she's learned that all must be trim and trig and ship-shape to withstand the "breezes that blow" in even a short spin in town. A handsome coat of fur such as this just described could be worn for almost any occasion. Of course, it would not be selected for rough country driving, but for motoring in town it is exceedingly fashionable, and may be made to do service in divers other capacities as well.

A handsome full-length coat was fashioned from blended squirrel, raglan fashion, with a huge storm collar of gray Siberian squirrel. This coat was seen in town, worn by a blonde, with just enough color in her cheeks to make the gray fur becoming. A small cap was worn with this coat, the crown of which was made from the blended squirrel, the brim showing the plain gray.



From Scandinavian Fur & Leather Co.

FOLLOWING THE VOLUMINOUS MODE



From Scandinavian Fur & Leather Co.

THE LOUIS COAT STYLE IN LEATHER

For those birds of fashion who

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are about to flit southward and whose "feathers" must be for the balmier days of the Southland, there are cloth coats in tweeds, and the like, of simple and effective style. The hair-stripe which has been seen this winter, in the most exclusive tailored walking suits, is appearing in these motor garments. In men's coats the choice is the small invisible checks and even quiet plaids.

While furs have first interest, they have, by no means, displaced leather garb. It is remarkable the effect that can be obtained from soft suede, its soft, flexible qualities affording the designer a splendid medium, and its warmth filling most satisfactorily the practical demands put upon all motoring apparel. An extreme style is the Lonis coat in leather. This presents an opportunity to indulge the feminine fancy by adopting a style, the daring nature of which assures it exclusiveness. This style is most effective, in fact is effective only, on a tall, slender woman. The skirt, of course, matches the coat. Both are finished with welt cordings of velveteen, that add the necessary touch of smartness without loss of that severity which is considered so all important in the correct motoring costume.

A long coat of a grey silk of high sheen is cut with a bias seam back that gives it a smart flare. It reaches quite to the hem of the dress-skirt beneath, which is the accepted two-inches-from-the-ground length. Smoke-pearl buttons fasten the double-breasted front. The lining is a long pile plush of blended grey and white, designed to represent squirrel. The entire garment is interlined with rubber and there are turn collar and cuffs of the plush.



PERSIANA WITH BLACK LYNX

A recent importation is a new mask goggles, with a suede frame in either brown or grey shade. These are exceedingly comfortable and light weight, although they are lined with fur. They are designed to meet the edge of the storm collar and afford perfect protection for the face when encountering a strong wind.

There are many clever devices to protect one from the winds, such as an inner cuff attached to the lining of the sleeves in both men's and women's coats. These cuffs are edged with fur and have an elastic drawn through the edge, closely encircling the wrist. This feature forms an effective barrier to the wind when gauntlets are not worn.

Leather gauntlets are given a preference over the coarse fur effects, and the comfortable fleece-lined or fur-lined variety are worn considerably.

One handsome motor outfit having a beaver coat and cap shows beaver gauntlets to match. These gauntlets are lined with silk and have a heavy interlining of flannel. A pale lilac veil of double chiffon is designed to be worn with this outfit, and the contrast of the soft brown of the fur and the delicate blue of the veil produces a charming effect.

While chiffon veils are used to some extent, double-chiffon yard goods is given the preference. It is not only more durable, but is warmer than ordinary chiffon. While delicate shades are used to considerable extent, the more serviceable dark green, and the staple blue, chiffon veils, the latter in either royal or navy shades, are seen a great deal. Other colors worn to a considerable extent are tan, plum, brown, and even bright red. Pink is a rather extreme novelty and is somewhat trying to the complexion, but when worn in town with fashionable furs the effect is modified and likely to be pleasing.

FASHIONS AT THE SHOWS.

Fashionable Fads of the Moment Adapted for Motor Car Use—Beautiful Furs—Rubber Silk—Waterproofed Cloth—Whole Costumes of Dainty Suede and Flexible Leather—Extreme Novelties in Veils and Hoods—Fascinatingly Pretty Headgear—What Some of the Fashionables are Wearing.

The motor-car shows have proven the fashionable success of the season. So many of the social leaders and their *entourage* were recognized in the promenade, that at the opening evening one might well have imagined it the start of the Horse Show, or the first night at the Metropolitan Opera House—save and except for the surroundings, the absence of boxes, and the prevalence of street and motor-car costume in place of the regulation evening dress.



PULLING STRINGS FORMS THE HOOD

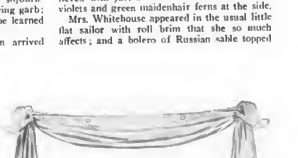
Quite a social affair was the private view at one of the shows in the afternoon. An invitation affair exclusively, the cards were closely scrutinized at the door. The fact that the "motors," without the "pro," of this show, as one of the visitors aptly termed them, are all men of position in New York society, gave a *cachet* to the affair, and their guests were all of the same section of the social world.

Town folk, of course, wore ordinary afternoon dress, for the city motor coat is nowadays of the limousine order. But the Long Island, the Tuxedo, the Westchester sojourners—they all arrived in correct motoring garb; and a lesson in fashion might well be learned from the women of those colonies.

Mrs. Mortimer and Mrs. Haggin arrived together with Miss Edith Lounsbery; and all three wore close-fitting little turbans, with ombre or shaded chiffon motor veils tied on in handkerchief fashion. Two Empire coats, one of eraracul and the other of otter, topped short cloth walking skirts; while the third member of the party was enwrapped in a long and loose affair of sea lion.

Mrs. John Jacob Astor flitted in for a few minutes, and paid far more attention to the cars on view than to the company. A black chiffon velvet gown, *sans traine*, and silver fox furs comprised her custume, and the closely fitting little black velvet toque was relieved with just a little bunch of white velvet violets and green maidenhair ferns at the side.

Mrs. Whitehouse appeared in the usual little flat sailor with roll brim that she so much affects; and a bolero of Russian sable topped an Empire coat of dark green velvet, bordered all around with the imperial fur. A huge flat satchel muff of sable showed a deep fringe of tails.



PULL BUTTONS FOR STRAIGHT SCARF.

Mrs. Alfred Vanderbilt displayed a three-quarter length coat of chinchilla, the dark markings cunningly matched to form a striped pattern that assumed various directions according to the design. One of those smartly nondescript hats in pale lilac satin beaver with a

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long and aggresive looking osprey sticking out from one side was held on by a motoring veil, tied in scarf fashion over the hat, but removed on entering the exhibition hall. Mrs. Vanderbilt seemed to know pretty nearly as much about the mechanism of a motor-car as the best informed enthusiast, and was quick to recognize departures from established types.

One smart little visiting French woman was gowned altogether in gray suede, save for her smart little chapeau, a white grebe toque with two little Mercury wings at the sides, those in a velvet blue. The coat was just a short and conspicuously loose caraco, the front fastening simulating a vest effect, and braided in silver soutache. The sleeve was of the plain tailored type, close fitting, and braided all over after a vermicelli pattern, as was likewise the Napoleon collar. This idea of a braided sleeve to a plain jacket is something novel, and is bound to take tremendously. The skirt was of comfortable, walking length, managed with a hip yoke extended in tablier fashion down the front breadth; the sides knife pleated, the pleats caught with a tape underneath, and the back a triple box pleat, running unbroken from waist to hem. A gray velveteen binding was plain to be seen at the hem. Gray suede boots, laced, and cut comfortably high, and gray castor gloves completed this fascinating little costume that spoke Paris eloquently in every line.

But the most interesting costumes were not all on the promenade, by any means. The Scandinavian Fur & Leather Company had a whole room full of the most fascinating effects in motoring dress, things that to see is to admire, and to admire is to covet. There is not a possible want or desire of the motorist, whether driver or passenger, that they have not provided for.

In view of the Southern racing season, there are some of the smartest surtouts in pongee, in rajah, in griffonette, in which really advance features of French fashion are cleverly presented. Although one would not suspect it from their appearance those modish coats are all of them absolutely rainproof, so that a sudden shower will in no wise spot or damage their smart appearance.

Another interesting point for the enthusiastic motor-car traveler is that all of the new



CHIFFON VEIL AND DETACHABLE VELVET HOOD.
Shown by Starn Bros.

leather coats—and there are some distractingly pretty ones among them—are so finished that the leather instead of getting stiff and heavy after a wetting grows only the more pliable the more rain or water that it encounters.

One perfectly beautiful example follows the favored Empire mode—that is, the true Empire fashion, in which the body part is characteristically short, and the skirts so cleverly cut that they sink in at the natural waistline, thus giving the figure a modishly slender and *svelte* appearance. This is in a medium shade of green ooze calf, with a lining of padded and quilted white satin, brocaded with tiny Dresden



OF WATERPROOFED CHIFFON SILK.
Shown by Scandinavian Fur and Leather Co.

bouquets; and long tie strings of black velvet ribbon appear from beneath the Napoleon collar ending far down in a fringe of little gold beads.

Sea lion, Russian pony, civet, marmot, hair seal, baby seal, Japanese mink, gray squirrel, and other furs are in the very latest mode.

The tailors and furriers, naturally enough, expend more than a little effort to make and keep motor-car garments entirely distinct from the coats and furs and wraps that do duty for other purposes; an aim and purpose that fashion, while favoring it, does not always fulfill. Still, there is a distinctive something to the output of the best specialists that characterizes it as a motoring garment, wherever it be worn, and its wearer will usually find herself accorded the attentions to which autoists are usually treated.

One New York woman of moderate circumstances who, while she does not own a motor-car, is often a guest in those of her friends, declares that when she shops in motoring garb she receives far more prompt and courteous attention on the part of salesmen and women than when she is attired in ordinary street or shopping costume.

There is a novelty in the shape of a combination veil and hood, the Mon Bijou, shown by Boehm & Levine, that has been devised especially for warm weather wear without a chapeau; and lends itself equally well to being adjusted over any style, shape, or size of hat that fashion favors. The hood part is in liberty silk, crepe de chine or any other light weight silk that will prove at once comfortable and modish in wear. The front veil, the part that covers the face, is in a *mousseline de soie*, thin and entirely transparent, and of such special weave that it does not interfere in the least with the sight. Quite an important item, this; and every woman who wears one will heartily endorse it as *mon bijou* of a motoring veil.

Those long scarfs of shaded chiffon are really charming—when the colorings selected are the ones most complementary to one's own hair and complexion. Smart folks wear these simply tied on over the hat, just in a scarf fashion, and knotted prettily under the chin.

And, by the way, the fact as to whether a bow beneath the chin be becoming or otherwise is a point that should be studied. Its size, its shape, its location, as well as the primarily important point of color, should be taken into consideration ere it is donned. One's appearance can be made or marred by the ill-advised choice and the careless adjustment of the veil.

Few opportunities are offered in any other style of dress to achieve a delightfully romantic appearance as in conjunction with motoring garb, although popular opinion seems to be that to be correctly accoutered for the machine is to be truly hideous.

Where some protection for the eyes is necessary, and the so-called goggles are not liked, there are hand shields with two panes of mica, one in blue for very sunny use, and the lower one in white for ordinary vision. They have a little hook that catches in the front of the hat, and so lessens the fatigue of holding them against the face.

Not only are all the latest dicta of fashion carried out in those elegant silken rubber coats, but more than one private tailor is advising his customers that he is prepared to make rainy day costumes from this modish fabric as well. They look just exactly as a high class taffetas or satin coat and skirt do; and all of the smart pleatings, bias band and folds, tucks, shirrings, pipings and all the rest of the dressmaker's repertoire of clever trimming tricks are carried out in those. The same makers have a mohair woven with a pure gum rubber that they are making the smartest storm coats from and costumes of a loose sacque coat and kilted skirts are most attractive in this weave. Pebbled sicilienne, too, is similarly handled; and either will be found most desirably smart for southern use now, and for warm weather purposes later on.

In those smart fur accessories to motor-car travel and comfort there are fur-lined boots, fur-lined aprons of leather with pockets cleverly placed so that one can slip the hands as into a muff; little rubber pillows to be blown up and placed behind the back; fur-covered foot rests of brass and copper that are connected with the motor and so kept hot; fur gloves with gauntlets reaching to the elbow where they fasten with a strap and buckle, or else with a snap clasp.



VEIL SHOWING TRANSPARENT CELLULOID.

And now it is that Dame Fashion takes a hand in the motor-car itself, and dictates the most exquisite of materials and effects for its lining. One electric hansom has been fitted by Paquin in a lilac-colored satin brocadeloth, with what is said to be one of the finest pieces of real Irish point that has ever come into this country. That there has been a crowd around this daintily equipped vehicle since the moment it was placed upon view goes without saying; and since Paquin has set the fashion, doubtless there will be many who will follow it here, and have the "boudoir hansom," as it has been termed, lined to suit the favorite color fad.

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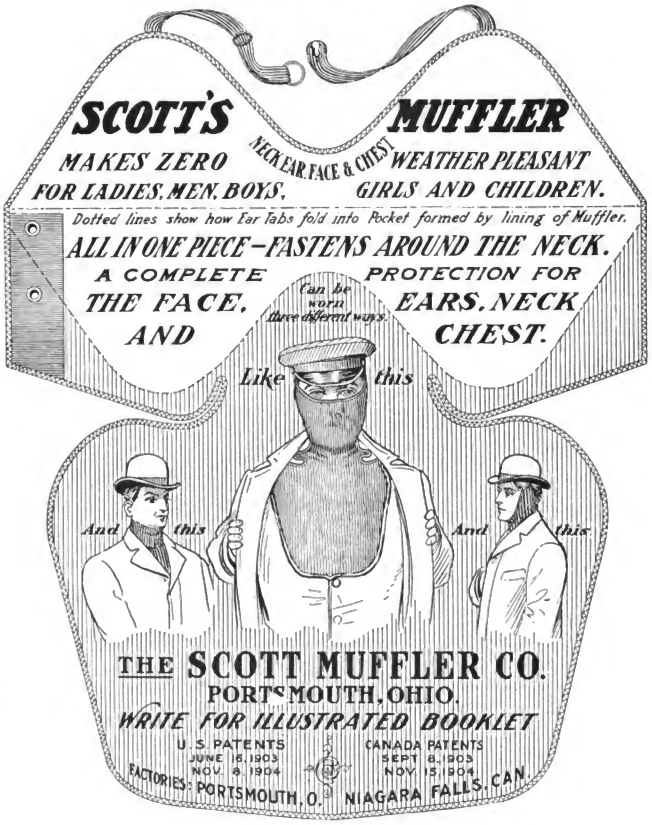
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(Continued from Page 173.)

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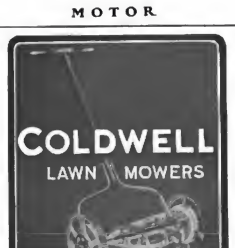
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VOLUME, as exhibited in air and all gases, is potential energy.

If a gas is reduced in volume by compression, the potential energy becomes actual energy in the form of heat.

The rate of gain is very nearly at 2.41 to 1. To this should be added the mechanical energy derivable from the condensed gas after its usable heat is extracted, and which is due to its density.

This remaining heat energy, developed during the back stroke of the piston, is even more important; its effect is variable, being greater, in proportion to the compression is less. If air at standard temperature of 62° F., and pressure of 14.7 lbs. per square inch is compressed to one-half its volume, it will develop 522° F. of heat, which may be abstracted for use. Expanded in the most favorable manner, on the return stroke, the ratio of gain is raised to 7.5 to 1.

If 4 parts of air is compressed into 3 parts, the ratio of gain is about 15 to 1. the heat developed being 174°.

The ratio of 2.41 to 1 is the same whether the compression be great or little. Other reversible heat engines may show similar heat gains.

The hammering of an anvil and the compression of a spring, will probably show like gains.

Air in expanding, doing work wholly at the expense of its contained heat, converts theoretically .414 per cent. only of its heat energy into work; 58.6 per cent. being required, it would seem, to push its molecules apart.

This heat absorbed is "latent" heat in the same sense that the heat absorbed in melting ice, or in the formation of steam, is "latent" heat.

When the process is reversed, the reverse result obtains; .414 per cent. of energy develops 100 per cent. of heat energy or 2.41 times the work expended.

Lord Kelvin showed that theoretically only a certain portion of heat energy can be converted into work. So, by certain means, it is seen, work may develop more than its equivalent of heat energy, and neither of these cases is opposed to the "conservation of energy."

If in one way we are required to pay for more than we receive, why should it be deemed impossible that by its reversal we get more than we pay?

From these premises it is evident that we have in the air that surrounds us an unlimited source of power, and that an engine may be devised that will from this source develop sufficient energy to supply its own required heat and yield also energy for independent work.

It is not "perpetual motion" any more than the turning of a mill wheel by an unfailing stream, is "perpetual motion."

The second law of thermo-dynamics provides than no energy can be derived from the cooling of any substance below the coldest of surrounding substances. This, as I shall shortly shaw, is absolutely false; the doctrine of the "dissipation of energy" equally so.

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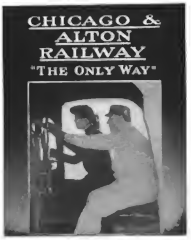
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An Important Announcement Concerning

OLD ENGLISH

BLACKJACKS

THE Gorham Company desires to direct attention to its extremely novel and original collection of Loving Cups and Tankards, offered under the name of "Old English Blackjacks."

THESE have been designed especially to meet the very wide-spread demand for articles of this nature which shall be as dignified and as decoratively effective, but yet not so costly as though fashioned of solid silver. They are made closely to simulate the Old English "Blackjacks" and "Leathern Bottels," those characteristic drinking utensils of the sixteenth and seventeenth centuries, which are to-day so eagerly sought after by collectors of artistic rarities.

THESE strikingly original examples of an artistic revival are to be found in all sizes from the drinking mug to the imposing Loving Cup, the tall Tankard or the well-proportioned Flagon. The bodies are of heavy hand-worked leather, the linings of red copper, the mountings, including the shields for monograms, inscriptions or armorial bearings, of sterling silver.

BLACKJACKS are exclusively made by The Gorham Company at very moderate prices, from five dollars upward, and are to be obtained from the important jewelers throughout the country, as well as from the makers.

THE GORHAM COMPANY

SILVERSMITHS & GOLDSMITHS

FIFTH AVENUE AND THIRTY-SIXTH STREET, NEW YORK

(The New Gorham Building)

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TRUSCOTT BOAT COMPANY, Dept. 57, St. Joseph, Michigan



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SILVER TABLE D'HÔTE, $1.50

SUPPERS DELIGHTFULLY SERVED

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A New and Exquisite Cordial

A delicious blend of the juice of the finest selected Grape Fruit and the best old Cognac Fine Champagne.

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We Buy and Sell Used Automobiles

and we do it successfully on a large scale.

Do You Want to Sell Your Car?

We have little better facilities than anybody else for disposing of your Automobile. Let us tell you how we do it—it may convince you that we can be of service to you.

Do You Want to Buy a Car?

We have a big list of bargains. Let us tell you what we can do for you.

Our Success Speaks Loudest for Our Ability as Brokers of Automobiles.

United States Automobile Exchange

38 East 21st Street Dept. A

NEW YORK

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Rates $1.50 per day and upward

Wire Reservations at our Expense

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GEORGE BUCKSCHAMER, Prop.

"A PENNY SAVED IS TWO PENCE EARNED."



Where a motor adapted with the *ordinary carburetor* consumes a gallon of gasoline for a given result in horse-power the **Morgan Carbureter** consumes less than half a gallon for the same result, and in addition gives greatest flexibility of control to the motor.

If you had such a carbureter on your car would you not feel that you were getting the maximum of horse-power for a minimum of cost?

Always remember that the carbureter is the heart of an automobile—when the heart goes wrong the whole car is wrong.

The MORGAN CARBURETER is founded upon right principles, which enable it to be the most economical and the most flexible carbureter made.

Let me send you full particulars concerning the MORGAN CARBURETER

B. MORGAN, 86-88 JOHN STREET, NEWPORT, R. I.

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MICHELIN TIRES

IT IS CONSIDERED "CHIC" TO HAVE MICHELIN TIRES ON YOUR CAR, EVEN IN FRANCE

Mr. E. D. Winans begs to announce that a new and large company has just been incorporated, consisting of American and French capital, to control the output of Michelin Tires and products in the United States under the name of Michelin Products Selling Company, Inc., 31-33 West 31st Street, New York.

All orders and inquiries for agencies and goods should be sent at once to

E. D. Winans, General Manager.

Mr. Winans is no longer connected with any other company or organization who claim to have American agency for 1906. The only representatives in the United States are the MICHELIN PRODUCTS SELLING CO., Inc., of 31-33 West 31st Street, New York.

MATERIALS IN CONSTRUCTION AT THE SHOWS.

THIS year the signs and portents of construction point unmistakably to the early adoption, in all high grade American cars, of special steels essentially the equal of those in use abroad. Heretofore it has been practically impossible for the American builder to get materials, especially steels, at home, which would bear comparison with those used abroad, and the few American manufacturers who were not satisfied to accept this situation were compelled after desperate and unsuccessful search to import their raw steels or forgings. This year, however, at least three American steel makers are making specific efforts to secure motor-car business in high grade nickel and chrome nickel steels. This is not the place to go into technicalities on the subject, but it may be said that these concerns are offering gear and shaft steels guaranteed to have ultimate tensile strengths reaching considerably over 200,000 pounds per square inch, and elastic limits from 100,000 to 200,000 pounds or over, depending on the use to which the material is to be put. At the same time their toughness and ability to resist shocks are beyond all comparison with ordinary steels.

In certain cases the iron from which these steels are made is understood to be imported, as the majority of American ores have too high percentages of sulphur and phosphorus to qualify them for the severest requirements. However this may be, the important thing is that it is apparently no longer necessary for the American motor-car manufacturers to waste months in pursuit of the unattainable, or to wait till the fag end of the season for importations.

A well advertised feature, and a radical departure from previous practice, was the use of cast Parsons' manganese bronze front axles on two very well-known cars, the Winton and the Premier. The ingots of this bronze are bought from the makers, The William Cramp & Sons Ship and Engine Building Co., of Philadelphia, Pa., and cast by the motor-car makers in their own foundries.

The reason for the use of this bronze, which is largely used for gear cases, for control levers, and other work, is not far to seek, because it is the strongest bronze on the market. Test pieces cast on or with the castings show a tensile strength of 65,000 pounds to the square inch, an elastic limit of 30,000 pounds per square inch; and an elongation in two inches of 25 per cent., and reduction of area of 25 per cent. But even these figures are sometimes exceeded, the tensile strength often running as high as 75,000 to 80,000, the elastic limit 35,000 to 40,000, and the elongation 35 to 40 per cent., and the reduction of area 30 to 40 per cent.

In addition to all of this, the makers have cast the axles in an I-beam section with a remarkably good utilization of metal so as to produce an extraordinarily strong axle.

One of the remarkable signs of the times marking the important place which the manufacture of motors is beginning to occupy as a staple industry, was testified to in a very emphatic manner by the appearance for the first time of exhibits of practically raw material in steel by the four largest producers of that metal in the world, the Fried Krupp Co. of Germany, the Bethlehem Steel Co., of Bethlehem, Pa., the Wm. Cramp & Sons, of Philadelphia, Pa., and the Midvale Steel Co., of Philadelphia, who have provided for the use of motor-car manufacturers a steel which is reduced in dead weight, but highly resilient, ductile and tough, having great tensile strength, high elastic limit to resist shock. Like wrought iron it will stand bending backward and forward through a small angle a great number of times. All these firms supply steel of forgings and in bars of ordinary sections. The Light Manufacturing and Foundry Co., of Pottstown, Pa., whose long and varied experience in working aluminum has brought them to the fore in its varied application for the purposes of the motor-car, exhibited specimens of aluminum castings, a metal which has done much to reduce the weight of the cars without reducing their strength, as well as of their manganese and phosphor bronzes.

Another interesting display in metal were the seamless rings made by the Standard Welding Co., who, in addition to a large output of stock rings, make rings from the builder's specifications, for chucks, gears, blanks, pails, and poles. These rings are made from Bessemer, open hearth, or crucible steel, copper, brass, and bronze, and are rolled and welded by electricity, made true to circle and to lay flat on surface plate.

The Shelby Seamless Steel Tubing of Pittsburg exhibited specimens of the well-known tubes which they make for the trade according to specification.

The Briscoe Manufacturing Co., of Detroit, Mich., sent specimens of all the sheet metal parts required on both water and air cooled motor-cars, a department which they have been obliged to increase their plants to accommodate.

The S. F. Bowser Co., of Fort Wayne, Ind., had a complete outfit of their tanks and system of gasoline storage which prevent evaporation, preserve the gasoline, and reduces the fire risk.

The Hess-Bright ball bearings were a continual puzzle to the uninitiated, but their presence on so many of the completed cars was a sufficient testimony to their appreciation by the practical manufacturer.

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OUR factory buildings and equipment, materials and processes, are unapproached in the entire American automobile industry and in many essentials Columbia Gasolene Cars for 1906 are a full year in advance of all others. This is not mere assertion. Make the comparison yourself. In no other cars will you find crankshafts machined cold from a solid block of metal and Chrome-nickel steel transmission shafts, jack-shafts, gears, etc., nor the I-beam front axle forged in one continuous piece. In no others will you find the same perfection of body designs, beauty of color schemes and painstaking details of finish. Mark XLVII, four cylinders, 40-45 h. p., double chain drive, price $4500 to $5500, according to body, is the accepted ideal of the American high-powered car. Mark XLVI, four cylinders, 28 h. p., shaft-drive, price $3000, stands alone among medium-powered four-cylinder cars. Mark XLIV-2, two opposed cylinders, 18 h. p., shaft drive, price $1750, we offer as the highest grade two-cylinder car in the market.

Separate Catalogues of Columbia Gasolene Cars, Columbia Electric Carriages and Columbia Electric Commercial Vehicles will be mailed on request; also, special illustrated booklets: "Columbia Chrome nickel Steel," "Fashioning a Crankshaft," "Consistent Differences in Columbia Cars," "Transmission, Etc"

ELECTRIC VEHICLE COMPANY,

HARTFORD, CONN.

New York Branch: 134-136-138 West 39th Street. Chicago Branch: 1332-1334 Michigan Ave. Boston: Columbia Motor Vehicle Co., 74-76-78 Stanhope Street. Philadelphia: Pennsylvania Electric Vehicle Co., 250 North Broad Street. Washington: Washington E. V. Transportation Co., 13th Street and Ohio Ave.

Member Association Licensed Auto. Mfrs.

58

Queen Cars

BEAUTY POWER



26-28 H. P.	MODEL "K"	$2000.00
to 18 H. P.	MODEL "E"	1100.00
10-12 H. P.	MODEL "F"	800.00

The Majestic Automobile Company, 54th Street and Broadway NEW YORK CITY

Write for Descriptive Catalogue

ALTEMUS SECONDARY DISTRIBUTER AND PRIMARY TIMER.

C. L. ALTEMUS & CO., Bourse Bld., Philadelphia, have improved the model of their secondary distributer, to be used with a single coil, and their primary timer, requiring a coil for each cylinder. Both of these devices are of exceptional merit and are noticeably superior to their original designs. It will be remembered that their two-coil model distributer was designed with the secondary distributing apparatus in the front of the instrument and the primary contact mechanism in the rear. This order has been reversed; and several mechanical changes have been made, resulting in a distributer perfect synchronized and of unusual efficiency.

The novel feature of the new Altemus primary timer is the reciprocating contact. The contact consists of a steel barrel or guide having two compartments of different diameters, the smaller being at the lower end. In this barrel is placed a specially made tool steel plunger properly hardened, so designed as to extend 3/32 of an inch beyond the lower end of the guide and having the appearance of a half sphere or ball. The other end of the plunger is larger in diameter and bored out to receive one end of a helical spring; the other end of the spring finds its backing against the cap nut of the barrel. Between these two points the plunger is free to move but is always held by means of the spring against the shoulder formed by the metal between the larger and smaller diameters of this barrel, which is held in such a position by the rubber body of the timer as to permit the plunger to engage a chrome steel roller the moment a spark is desired. When contact is made the roller turns on its bearing and the plunger recedes against its spring.

This reciprocating feature practically eliminates friction and wear and at the same time makes a perfect electrical connection. This contact has been actually tested to a speed of 1,700 revolutions per minute for eight hours daily for twenty-four days consecutively—and this without missing or showing any appreciable wear of the timer.

Dimensions with cover on are: Diameter 2½ in., length body 2¾ in.

The construction of the Altemus Secondary Distributer is extremely simple as explained. As the primary contact is the vital part, it has been placed in the front, where it is readily accessible for lubrication and can be removed without taking timer from shaft. This embodies the same reciprocating feature of a roller passing over a spring plunger, as described above in connection with the primary timer. At the back end, thoroughly insulated and protected from dirt and moisture, is placed the high tension distributing apparatus. This consists of a metal ring with a fan extension, which revolves in exact synchronism with the primary contact maker. The fan extension passes in rotation the terminal posts which lead to the spark plugs. The rim itself revolves constantly under terminals which is directly connected to one of the secondary binding posts of a coil, the result being that when the primary circuit is completed, the ring is instantly charged with a secondary current, which it discharges through its fan to the plug to be fired. As a small spark gap is left between the distributing ring and the terminal post, there is absolutely no friction or wear here—it practically runs idle. Two other points to be noted are the long bearings extending nearly the whole length of the distributer, and the substantial metal back which supports and strengthens the rubber case. The dimensions are: Diameter 3 in., length over all 4 in.

A NEW POCKET METER.

THE Atwater Kent Mfg. Works, 42 North Sixth Street, Phila., Pa., manufacturers of ignition specialties, have introduced a new feature in their Automatic Volt Ammeters. This is the "Dead Beat" needle, which on account of its quickness in coming to rest assures a quick and accurate reading.

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(*Continued from page 139.*)

A large number of cars are now equipped with one or another form of shock absorber, the Truffault Hartford being still a great favorite. They likewise form part of the regular equipment of the Pengeot, Brasier, Great Arrow, and Fiat.

A novelty observed in the Raudler is an extra leaf clipped against the main leaf of each spring, both at the center and at the ends. This leaf is several inches shorter than the main leaf, and the end clips go around one of the regular leaves as well, thus giving three leaves to resist rebound.

A feature observed in the Ardsley and Packard, in which they differ from other cars with propeller shaft drive and rear semi-elliptic



CADILLAC SPRINGS AND BRAKES.

springs, is the use of radius rods from the side members of the frame to the rear axle. These are plain jointed rods and those of the Packard are without adjustment, adjustment being unnecessary where no chains are used. They serve simply to keep the axle at right angles to the frame, and do not take the place of the torsion rod, which extends from the axle casing to a cushion bracket on the frame just back of the gear box. Owing to the use of these radius rods the rear springs are shackled at their front as well as at their rear ends. In the Packard, it may be here remarked, the customary semi-elliptic side springs are for the first time used on the front axle in place of the cross spring formerly identified with Packard construction.

The Peerless car has platform rear springs and non-adjustable side radius springs similar to those of the Packard, but more necessary on account of the different arrangement of the springs.

TRANSMISSION SYSTEMS AT THE SHOWS.

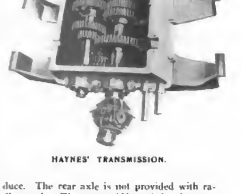
THE subject of flexible connections between the motor and the transmission gears, and between the transmission gears and the sprocket pinions or rear axle (as the case may be) seems to be in a somewhat more indefinite state today than it was a couple of years ago. The Oldham coupling, formerly a part of every sprocket countershaft, has wholly disappeared, owing largely, no doubt, to the fact that the ball bearings now universally employed at the outboard bearings of these shafts will bear a certain amount of springing in the shafts. Such cars as the Panhard and Mercedes use no definite flexible connection at all in these shafts, but employ a construction permitting a very slight degree of natural flexibility between the clutch and gear box, and between the gear box and the sprocket pinions. In other cars, such as the Locomobile, the shaft between the clutch and gear box has two full-floated cardan joints of good size, which would have been thought adequate for a propeller shaft a couple of years ago. Still others present the anomalous combination at this point of a cardan joint at one end of the shaft and a slightly loose square slip joint at the other, or even of apparently no flexible joint at all, and the thing is more puzzling because the cardan joint in such cases is always nearest the gear box. Most of these cars are brand new 1906 importations, whose exhibitors usually know little more about them than the questioner, and in the absence of sectional drawings or opportunity to take the car to pieces it would necessarily seem that the clutch must contain some provision for flexibility not seen.

The accepted number of gear ratios for high powered cars has come to be four, and for medium powered cars three, and with four speeds, as well as with three, direct drive on the high gear has found general favor. The only important exceptions noted were the Fiat, Martini, and De Dietrich. As this arrangement is usually worked out, it involves driving through two pairs of gears in the three lower speeds, two of which are likely to be used considerably. The Mercedes and the Züst show with slight modifications an arrangement such as was used in the Mors some three years ago, viz., a bevel driving pinion at the rear end of each of the spur gear shafts, meshing with corresponding bevel gears on the differential. These pinions are of different diameters, that on the first gear shaft being the larger, and for the direct drive this pinion is clutched directly to the shaft, on which it otherwise turns loosely. For the other speeds this pinion is unclutched and the suitable gears meshed to drive through the jack shaft and the other bevel pinion.

In the Thomas, a special feature is the disengagement of the jack shaft when driving direct. This is accomplished by making the driven gear on the jack shaft slide on a squared section of this shaft, and shifting it out of mesh with the pinion when the latter engages the sliding train.

A feature worthy of notice is the ratchet connection used in the Haynes car, between the jack shaft and the constant mesh gear attached to it. The difficulty of gearing down when the car has no resistance such as a hill or a muddy road, to quickly retard its speed, is familiar to most operators of sliding gear cars. It is in fact much harder to gear down under such circumstances than to gear up without letting the teeth grind against each other. All this difficulty is prevented by the ratchet in the Haynes car, which permits the car to run ahead of the engine during and just after the shifting of gears, until the engine and clutch have been accelerated.

The Northern transmission resembles that in the Packard in that the speed changing gears are carried in a casing integral with the casing around the bevel gears and differential. In the Northern, however, the countershaft is below the direct shaft. Three forward speeds are given, with direct drive on the third. The propeller shaft is housed in a sleeve rigidly connected to the axle casing, and carrying a thrust bearing as well as a radial bearing at its forward end, which positively locates the shaft within. Just forward of this thrust bearing is the cardan joint, whose forward member is forged into a reet-angle about 4 or 5 inches wide, and an inch or less in thickness. This enters a slot in the clutch hub, thus affording a slip joint which provides for as much fore-and-aft movement as the full elliptic rear springs can pro-

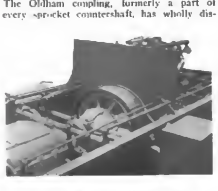


HAYNES' TRANSMISSION.

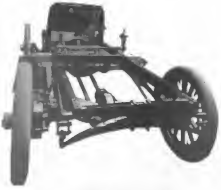
duce. The rear axle is not provided with radius rods. The gear shift rod in the rear casing is notched and held in position by a spring plunger, and is actuated by a tube running to a crank at the lower end of a shaft which runs through the steering column and carries a wheel smaller than the steering wheel at its upper end. This shaft is not locked, but is free to turn slightly to accommodate itself to the movements of the rear axle, thus avoiding liability of the sliding gears jumping out of mesh.

In the gear box of the Pope-Toledo Model XII the intermediate speed gear on the jack shaft is bolted to a flange instead of being keyed on the round shaft as last year. In other respects the transmission system does not differ from that of last year's models, which are continued this year. Liberal use, however, is made of special steels from the Carpenter Steel Company, these being employed in the crank shaft, transmission and gear shafts, gears, axles, and other parts.

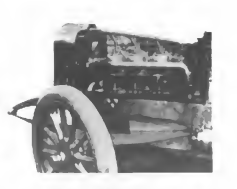
The new four-cylinder Knox car has a four-speed selective transmission gear essentially similar to that of the 1905 Mercedes already referred to. The gear shafts and differential shafts run in Hess-Bright ball bearings.



C. G. V. FOOT BRAKE AND FAN.

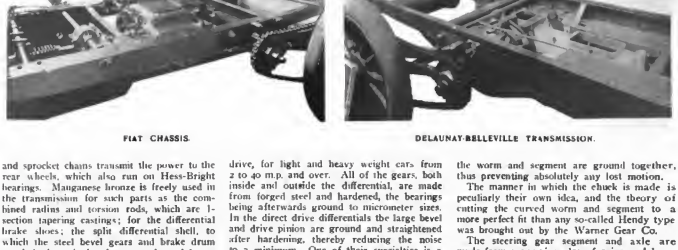


PEERLESS CHASSIS.



LONG VIQUEOT SPRING.

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FIAT CHASSIS. DELAUNAY-BELLEVILLE TRANSMISSION.

and sprocket chains transmit the power to the rear wheels, which also run on Hess-Bright bearings. Manganese bronze is freely used in the transmission for such parts as the combined radius and torsion rods, which are I-section tapering castings; for the differential brake shoes; the split differential shell, to which the steel bevel gears and brake drum are bolted; and also for a number of levers in the control mechanism, including the pedals. The Knox transmission differs from the Mercedes in having only one foot brake instead of two. This brake, however, is of very generous size and is interconnected with the clutch. The rear brakes are of the enclosed expanding type and are independent of the clutch.

The much-advertised Ford runabout and touring car have essentially the same transmission and running gear as the Ford touring car of last year. In the runabout, however, the construction is simplified by putting the flywheel at the front end of the motor, and making one casing enclose the motor cranks and the planetary gears. The flywheel has fan-blade spokes, and the front axle a single cross spring. A pair of distance rods form a triangle with the front axle, and pivot together in a socket under the dropped cross frame which carries the rear end of the gear casing. The propeller shaft cardan joint is enclosed in a large socket, just formed on the front end of the sleeve which encloses the shaft. This sleeve, being rigid with the rear axle casing and stayed by side rods, serves also as a torsion rod.

The Warner equalizing gears shown demonstrated that their differential is made for strength and durability, which is readily seen by examining the illustration herewith. The hubs of the two axle spur gears are mounted in long bearings which absolutely prevent the spur gears from getting out of alignment and binding the pinions. There are additional web gearings positively preventing end thrust through the case from either side. All of the gears and pinion bearings inside of the differentials are hardened and ground to sizes, which, with their superior construction, give long life to the Warner differential.

These differentials can be altered, if necessary, to meet the maker's requirements, so that if stock sizes are not exactly suitable blue prints may be sent on for estimates.

The gears are made for both chain and bevel drive, for light and heavy weight cars from 2 to 40 m.p. and over. All of the gears, both inside and outside the differential, are made from forged steel and hardened, the bearings being afterwards ground to micrometer sizes. In the direct drive differentials the large bevel and drive pinion are ground and straightened after hardening, thereby reducing the noise to a minimum. One of their specialties is a differential made for very heavy work, such as trucks, etc., and this pattern, with slight alterations, can be used for various types.

The peculiar feature which makes the Warner differential a merit is the fact that the gear is individual throughout. The pinions are set on large bolts that have heads larger than the pinions and the bolt heads act as a cover to the individual openings where the separate pinions are inserted. The bolts are case hardened and ground true on dead centers, the pinions are case hardened and lapped out smooth and made to fit the large bolts. The large spur gears are also hardened and the hubs are ground on both bearings; in fact, every bearing in the Warner differential is hardened and ground

A large majority of this year's differentials have extensions at the ends of the spur gears. These are a part of the case or retainers for mounting the bearings to insure accurate running on the bevel pinion and driving bevel. The Warner differential for 1906 has a small axle clearance in the ends of the gear housing, the gear case proper never touches the axle, so any sudden jar of the axle does not affect the teeth engagement.

The demand for a high-powered differential has caused the Warner Gear Co. to bring out a differential having 8 pinions with a very coarse, strong pitch.

The Warner Gear Co. also exhibited the strongest and largest equalizing gear ever built for the same purpose, suitable for a 10 to 30 motor power truck. This is a stock gear and is built for one of the heavy truck companies who are using a large number of them for heavy trucks.

They showed a new steering device. The chuck is a worm and segment form very peculiarly cut out of open hearth steel. The worm and segment are cut on the theory of the Hendy or curved worm pattern, and is so improve that every tooth in the worm is in full mesh from top to bottom in the segment, thus insuring a positive fit. Before assembling, the worm and segment are ground together, thus preventing absolutely any lost motion.

The manner in which the chuck is made is peculiarly their own idea, and the theory of cutting the curved worm and segment to a more perfect fit than any so-called Hendy type was brought out by the Warner Gear Co.

The steering gear segment and axle are made from a one-piece drop forging and have long bearings on both ends. The chuck is adjustable up and down and toward the apex of the curved worm. The ball and socket lever connections can be reversed on front or back, right or left as the case demands, and the device is made with right or left hand worm.

KINGSTON CARBURETER TYPE K.

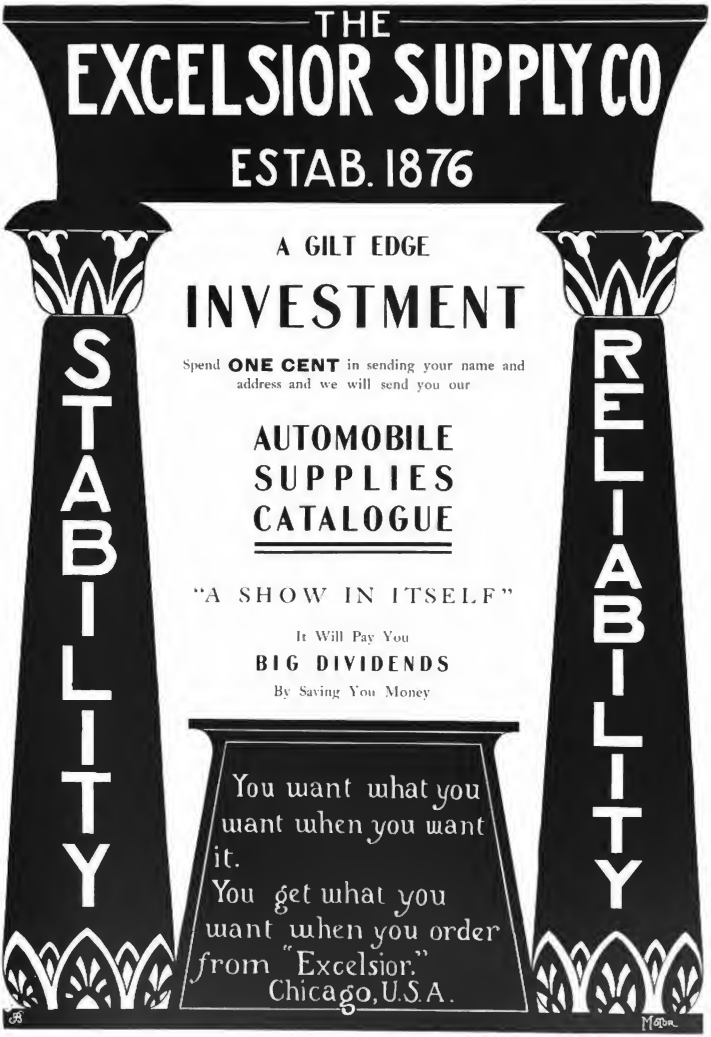
THE new Type K Kingston Carbureter, made by the Byrne, Kingston Co., of Kokomo, Ind., is of the class known as the light valve automatic carbureter. All of the air passing to the carbureting chamber is drawn by the suction of the motor past a light valve normally held to its seat by a spring. To this spring any desired tension may be applied by screw adjustment. By this method a practically constant pressure is maintained in the carbureting chamber regardless of the speed of the motor. Under these conditions it is possible to deliver fuel from a constant-level chamber to the carbureting chamber in a constant spray, the quantity being regulated by a needle-point adjusting screw provided for that purpose. Between the carbureting chamber and the outlet to the motor a throttle valve is provided for controlling the amount of carbureted mixture admitted to the motor and consequently the speed of the motor.

In adjusting the Kingston Type K Carbureter to a motor, first open throttle wide and adjust the needle-valve "A" until the mixture is perfect for high speed and power; then close throttle, and, if the mixture is not perfect for low speed, adjust the tension-screw "B" until the mixture is perfect for low speed. This light automatic valve should seat very lightly and should be adjusted to admit air just free enough to correct the mixture at the low speed point, and the needle valve should only be adjusted at open throttle. Then if the carbureter is automatic it will regulate itself at all intermediate positions of the throttle.



PEUGEOT TRANSMISSION. CLEMENT GEAR AND DIFFERENTIAL CASES.

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Packard



The constant development of a single type of car year after year has enabled the Packard Company to work out methods, machines and special appliances to make every detail of that car better than it has ever been made before and better than it could possibly be made under any other conditions.

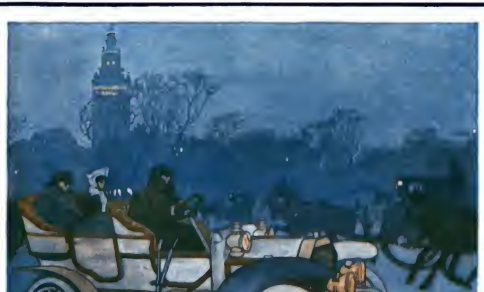
Packard Motor Car Co., Dept. 6

Detroit, Mich.

Member Association
Licensed Automobile Manufacturers

New York Branch:
1540 Broadway

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At the Madison Square Garden Automobile Show the

OLDSMOBILE

centered public interest in the Palace Touring Car and The Two-Cycle. Both of these cars emphasize the wonderful development of automobile construction in America. In style they set a swift pace for European manufacturers, and in performance they leave nothing to be desired in the way of speed, reserve power, easy riding qualities and general all-round completeness. Careful attention to the minutest detail is apparent in every line from the perfected motor to the adjustable lamp brackets.

If you, as a Possible Buyer of an Automobile (the Probable Buyer of an Oldsmobile after you have investigated) are too busy just at this time to let us give you a demonstration of our 1906 models, you can make a note, mental or otherwise, of the points which mark the strong individuality of these cars—the superior quality and big value they represent on your money investment.

In general appearance the Palace Touring Car, Model S and The Two-Cycle, Model L are very similar, both conforming in design to the most approved European practice. The general lines of both cars are the same. Both have all the regulation outfit, sliding gear transmission, pressed steel frame, bevel gear drive, material of the best—everything that anyone has or wants to have and a number of features all our own.

The gasoline "motor"—the *life center* of the automobile—is merely a gasoline engine. We have built gasoline engines for 25 years, and we know this end of the business—know what *not* to build as well as what to build. The result of this experience is found in the motor equipment of every Oldsmobile.

The Four-Cylinder Motor of Model S is compact and free from complications; it is vertical, water-cooled, located under hood, and perfectly balanced. The bore is 4¼-inch with 4¼-inch stroke, and the actual horse power is from 26 to 28. The weight of the car is 2,200 pounds. Wheel base, 106 inches. Price, $2,250, with complete horn and lamp equipment.

The Two-Cycle Motor is likewise vertical, water-cooled and located under hood. Bore, 5 inches; stroke, 5 inches. THERE ARE ONLY THREE WORKING PARTS IN THE MOTOR ITSELF. If you don't know anything about gears, valves, guides and a few other things, you don't have to learn, because they are not there in The Two-Cycle. It is a 24 H. P. team without a harness. It's the only new thing in the last five years—a trial will convince you. Price, $1,250, with complete horn and lamp equipment.

We have a number of other good cars in our line—cars that have proved their staying qualities and worth through years of service. Complete information regarding any of our models can be obtained by making use of the coupon below.

OLDS MOTOR WORKS, Lansing, Mich., U. S. A.

Member Association of Licensed Automobile Manufacturers

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CATALOG COUPON

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LANSING, MICH.

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Model S.... Passenger Traffic
Model L.... Cars....

Mr.
Name .....

Address .....

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CALENDAR COUPON

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LANSING, MICH.

Enclosed find 10 cents, for which send your large Art Calendar (free from advertising and suitable for framing) for 1906. Design by George Gibbs.

Mr.

Name .....

Address .....

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CUT COUPON HERE

MOTOR TALK COUPON

OLDS MOTOR WORKS,
LANSING, MICH.

Enclosed find 25 cents, for which have Motor Talk, *a magazine devoted to automobiling, sent to me for 1 year.*

Mr.

Name .....

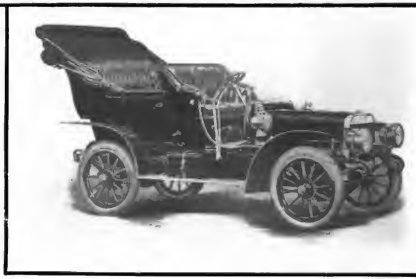
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WINTON MODEL-K

Accessibility Analyzed



ACCESSIBILITY means more to the Motorist, on *reflection*, than when first mentioned.

Being *able* to get at any part of the Mechanism which may be "out of whack" is important, of course. But of much more importance is the Winton construction which makes the Driver *willing* to get at it *immediately*.

You know how it is with Human Nature!

If the trained ear detects "something wrong" with the Motor, or Transmission, the time to investigate is *at once*—just as soon as the sound causes you to *suspect* it.

But you *won't* do that unless the Car Builder has made it mighty *easy* for you to do it on the spot.

If your Car is not *more* accessible than many that boast Accessibility you'll *wait* till you get it home to the Barn before you investigate.

And by that time much damage may be done that *could have* been easily avoided by quick and easy investigation on the *first* suspicion of "Trouble."

* * * * *

Many serious accidents arise from that sort of *postponement*.

Half the usual repair bills *can* be cut out by *early* investigation, and slight adjustments *in time*—on first discovery.

This is why *we're* made the Winton Model K the most *readily* accessible Car that ever was planned.

It is so *easy*, this season, to "get at" every working part of the Winton Model K that there's no *inducement to postpone* investigation and adjustment when any Trouble is suspected.

Five actual minutes will uncover the working parts of the Winton Model K.

You see we've planned *this* Car to work the way Human Nature works,—so that it is a *pleasure* to investigate its working parts.

Opening the hinged Bonnet exposes the Motor in less than a minute's time.

The turning of two handles uncovers instantly the whole Crank-shaft with its four connecting rods.

Lift up a foot-board, before front seat, turn a handle, and the entire Transmission Gear lies instantly before you.

A few minutes' more work takes that entire Transmission Gear clear out of its dust-proof case, for adjustment or repair.

* * * * *

Then, the Driving Axle is equally accessible.

Unscrew a single cap-nut, on either driving wheel, and you can *draw out* the entire Axle for inspection and adjustment, from its strong supporting Tube, *without Jack or Pit*, and without a Guest alighting from the Tonneau.

And all this has been planned so there need not be any stooping, groping, nor creeping under the Carriage, in that most undignified attitude which makes the Motorist's Guests pity him, on the spot, and ridicule him afterwards.

The Winton Model K is so accessible that its Driver *will fix* any lack of adjustment on *suspicion*, and on first discovery of it.

That means a big difference in the aforesaid Repair bills, safety, and longevity of the Winton car.

Don't underestimate *such* accessibility as *this*.

* * * * * *

The Winton Model K has:

—A vertical, 4-cylinder Motor.

—Thirty horse-power—or better.

—So cool that it evaporates only one quart of water per week.

—It has a new Automatic Compensating Carburetor, that works equally well under all conditions of hill-climbing, de-scending, or on level, and in all kinds of weather.

—It has an infallible Ignition System, which also permits starting the Car from the Seat, *without Cranking*.

—It also has a powerful Front Axle of Manganese Bronze, cast in one piece, without the usual *Welding* of Steel Axles, and the consequent probable misfit of the steering Mechanism resulting *from* that Welding.

—It has a fine surplus of *Reserve Power*, which takes it up very steep hills on the "high-speed" gear, and which enables it to do every kind of road work, even with heavy loads, without taxing or over-heating the Motor.

—Three powerful brakes, two on rear wheels and one on driving shaft, will stop the Car in its own length.

—Winton Pneumatic Speed-Control, operated by foot pressure (or by thumb on steering wheel if preferred) gives a range of speed *from* 4 miles an hour to 50 miles, *without touching a lever*.

—Winton Twin-Springs, that adjust themselves instantly to light or heavy loads, on smooth or rough roads, and that nearly double the life of Tires.

Magnificent carriage body, with superb upholstering and dashing style.

One price only—viz., $2,500 for Car equal to the best on the market at $3,500.

Get our new book—"The Motor Car Dissected." Volume 4.

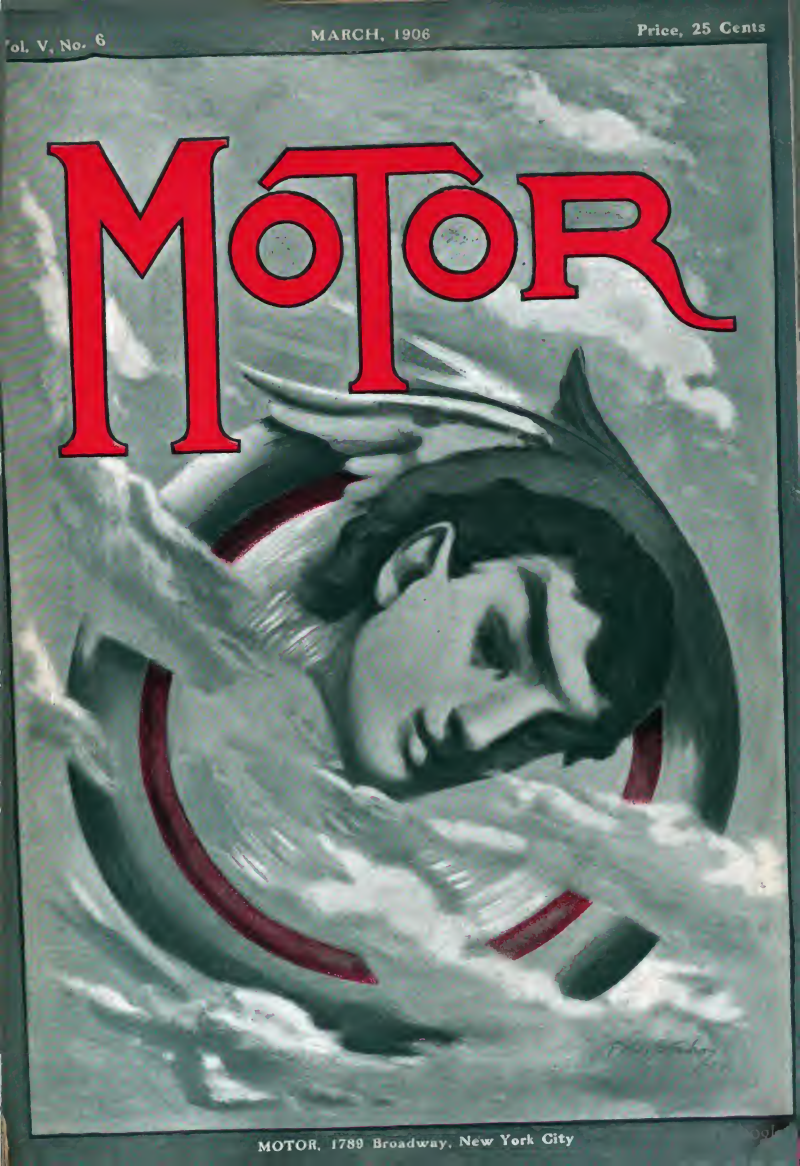
Write to The Winton Motor Carriage Co., Member A. L. A. M., Cleveland, Ohio.



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Vol. V, No. 6 MARCH, 1906 Price, 25 Cents

MOTOR



MOTOR, 1789 Broadway, New York City

FRANKLIN

If you want to carry five people faster and safer and with more comfort than anyone else can carry them on American roads, you want this Type D.

The point is this—The real power of the motor is out of all proportion to its rating; and is continuous; unhampered by overweight and can *always be safely and comfortably used.*

The Franklin auxiliary exhaust cools the cylinders so perfectly that the engine never overheats. Having no plumbing apparatus to carry; the design being simple; and the construction including so large a proportion of nickel-steel, aluminum, and other strong but light materials—the car weighs some five hundred pounds less than any water-cooled car of equal power; while the pliant Franklin frame-construction and elastic suspension prevents the jarring and jolting which uses up power and injures the car and the passengers.

Consequently the rated speed is actual road speed; it is maintained under full load without loss of power; and is not defeated by poor and hilly roads.

The full motor efficiency is always at hand, and always available; which gives the car greater ability under all circumstances than any other "30 horse power" car; and equal ability on American roads with any car of any power or price.

Type D is big in passenger-capacity; big in power, speed and strength—big in everything except useless weight and extravagant running expense.

Its light weight saves fuel; and saves tires tremendously. It never freezes; works all through the winter; does more for the price than any other car; and vastly more for the ultimate cost.

In luxury of appointments and refined beauty of design it satisfies the most exacting taste.

Four-cylinder Runabout $1,400. Four-cylinder Touring Car $2,800.
Four-cylinder Light Touring Car $1,800. Six-cylinder Touring Car $4,000.
Prices f. o. b. Syracuse, N. Y.

Write for the handsomest and clearest of all motor books.

H. H. FRANKLIN MFG. CO., Syracuse, N. Y., M. A. L. A. M.



Type D. Four-cylinder Touring-car. 5 passengers. Air cooled motor. 3-speed sliding gear transmission. 20 "Franklin horse-power." Disc clutch. Force-feed oiler on dash. 100-inch wheel base. 1,800 pounds. 45 miles per hour. Full head- and tail light equipment, $2,800.

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Proved-by-Experience

Reliability

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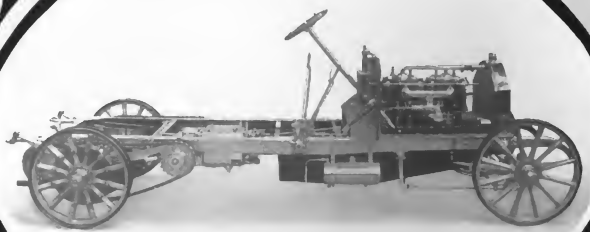
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FIAT

THE HOL-TAN CO.



The 1906 Fiat Chassis now on exhibition at the Hol-Tan Building has

Most simplified motor on the market. Automatic spark advancement. One lever motor control.
Dependable mechanical lubricator. Self-regulating carburetor. Multiple disc clutch.

RADIATOR SECURE FROM SHOCK

Water cooled brakes

1906 Models, with bodies by the best European and American designers, are now on exhibition at the Hol-Tan Building

The HOL=TAN Co.

Successors to HOLLANDER & TANGEMAN

Broadway and 56th Street

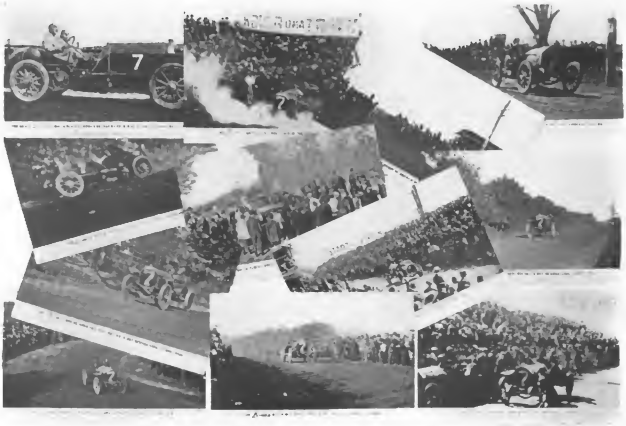
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The above illustration gives a good general idea of a set of 12 souvenir postal cards showing Dr. H. E. Thomas's *Locomobile* in the 1905 Vanderbilt Cup Race, defeating 12 out of 14 foreign racing cars and placing America second by countries. The first American car to be placed in an international automobile contest. These postal cards form an interesting souvenir of the Vanderbilt Race, are convenient for mailing, and will be appreciated by collectors of souvenir postal cards. The views were selected so as to show as many points of interest on the course as possible.

A five-color poster showing the *Locomobile* finishing in America's greatest race will also be mailed to any address on receipt of 10 c. in stamps. This poster is very attractive when framed, and may be framed with or without printed border as desired. An especially attractive souvenir, and something which every automobilist should have in his den.

Printed matter describing 1906 Locomobiles mailed post-free to any address on application.

The *Locomobile* Company of America, Bridgeport, Conn.

Member Assn. Licensed Auto. Mfrs.

NEW YORK, 76th Street and Broadway.
BOSTON, 15 Berkeley Street.
PHILADELPHIA, 249 N. Broad Street.
CHICAGO, 1354 Michigan Avenue.

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The "Invasion of the West" is typical of the invasion of the North, South and East by the

OLDSMOBILE

Here are the facts: We are to-day shipping Oldsmobiles to nearly every civilized country, and some half civilized ones. Russia, for the last three years one of our best foreign markets, is taking more cars to-day than before the present trouble broke out. We have met European manufacturers on their own ground and "made good."

Our Palace Touring Car, Model S, is the "top notcher" of 1906. It is a genuine American car, discounting European product at Wall Street rates. Send for booklet telling how we have packed more style, speed, stability and *brains* into Model S for $2250 than can be found in any car in the world for anything like the same money.

The Double-Action Olds is a car with two working strokes for every revolution of the crank. It's the "*latest*"—the "*new thing*"—in automobiles. It is free of valves, guides, cams, and other mysteries that usually terrify the uninitiated. Its motor has *only three working parts*. It's a giant for hill climbing and difficult roads. Its price, $1250. Write for our "Double-Action" Booklet.

OLDS MOTOR WORKS

Lansing, Mich., U. S. A.

Member of Association Licensed Automobile Manufacturers

Canadian trade supplied from Canadian Factory Packard Electric Co., St. Catherines, Ont.

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Kindly send me information regarding cars checked. I am interested.

Model B— **Delivery Cars**—
Model S— **Passenger Traffic Cars**—
MTR. **Model L**—

*Name*_____

*Address*_____

CALENDAR COUPON

Enclosed find 10 cents for which send your large Art Calendar (free from advertising and suitable for framing) for 1906. Design by George Gibbs. MTR.

*Name*_____

*Address*_____

MOTOR TALK COUPON

Enclosed find 25 cents, for which have MOTOR TALK, a magazine devoted to automobiling, sent to me for 1 year. MTR.

*Name*_____

*Address*_____

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This is the Pierce Great Arrow Victoria Tonneau, 40-45 H. P., with semi-enclosed top. Price without top, $5,000. Semi-enclosed top, $350 extra

THE PIERCE ARROW is a car whose final destination is neither the scrap heap nor the machine shop. There are probably more Pierce Arrows of old models now in satisfactory use than any other make of car. A Pierce car of several years back is a better investment than many 1906 cars.

The greatest obstacle to the ownership of an auto to many people is the cost of maintaining—not the ordinary garage charges, but the far greater expense of repairs, adjustments and the like. Even if you do not mind the cost of these, the annoyance and delay when a car breaks down takes away from the pleasure of operating it.

In the famous Glidden Trophy run the Pierce Arrow went one thousand miles without a single adjustment. More than that, it did not require an expert chauffeur or mechanic to do this. The performance can be duplicated by any American gentleman with a Pierce car.

If you are interested, we will send booklets and technical descriptions.

The George N. Pierce Company, Buffalo, N. Y.

Members Association Licensed Automobile Manufacturers

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Built by E. W. BLISS CO.

BROOKLYN, N. Y.



The Finest American Motor Car

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NEW YORK CITY

Telephone, 2895 Columbus

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There are two sections to every magazine—the editorial and the advertising. Neither is more important than the other. The reader buys a magazine for the interest which the editorial section has for him, and he expects the advertising section to be an *information bureau* of his needs.

The advertising pages of this issue of Motor should be as carefully read as the text pages, because they are its readers' *information bureau*. If you wish to buy a motor-car, you will find the standard makes advertised in Motor. If you wish tires, lamps, motor-car accessories, etc., you will find only the standard makes of anything represented in Motor's advertising pages.

Never hesitate to write to advertisers for more complete information than the advertisements contain. You incur no obligation if you do. And when you do, kindly mention Motor.

For information about anything not in Motor, write us and we will see that you are informed.

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MOTOR BUREAU

A Practical Plan for the Sale and Purchase of Second-Hand Cars

The buyer who waits till Spring before selecting a second-hand car is apt to find that he must wait, sometimes weeks, for his turn before his car can be received at a trustworthy shop for overhauling. When he gets the car back, he may find that the work has been hurried, and there are always some details, too miscellaneous to be put in the shop job, which must be attended to, before the car is in perfect order.

By purchasing in the early winter, the buyer has a chance to get acquainted with his car, and to have it overhauled under his own supervision before the Spring rush begins. Liberal allowance for these always-essential preparatory steps will often mean the difference between a successful season and a disappointment.

MOTOR BUREAU assists sellers by listing their cars offered for sale. It assists buyers by sending them descriptions of all listed cars likely to meet their requirements. A fee of $1 is charged in either case, which in addition entitles the payer to a 20-word "want" or "for sale" advertisement in Motor.

Your car or your want is put on our list immediately upon receipt of your dollar. If you write us for a car, you will receive an immediate answer telling you what we have listed. If you wish to sell your car, type-written copies of its specifications are made, and sent to prospective purchasers.

This plan eliminates the necessity of waiting several weeks for your advertisement to appear, and also seems to be the solution of the problem at present confronting automobile enthusiasts who have not the ready advantages of an up-to-date exchange house in their vicinity.

Our list is kept thoroughly up-to-date. We take particular care each month to eliminate all cars that are sold. If you are selling a car through us we keep that car on our list until it is sold, and vice versa; if you write us for a car we keep your specifications before us until we have done everything in our power to satisfy you.

Further particulars may be had by addressing MOTOR BUREAU, 1789 Broadway, or H. L. Towle, 150 Nassau St., New York City.

If you want to sell your Car

Fill out the coupon below and send it to us with $1, sent at our risk.

Fill out—Tear out—Mail to-day.

Motor Bureau,
1789 Broadway, New York City.

Enclosed find $1, for which please enter on your list the car described below. I understand that you will without additional charge give that car a 20 word "For Sale" advertisement in Motor, and also quote it to all prospective purchasers who are looking for a car of the following description:

Name of Car.....

Model or Date.....

H. P.....No. Cyl's.

Asking price.....

Extras

.....

Remarks on condition, etc. (Make these as specific as possible).....

.....

.....

If you want to buy a Car

State whether you want gasolene, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

Buyers wishing cars inspected, tested, or overhauled under expert supervision are referred to Herbert L. Towle, consulting engineer of MOTOR BUREAU, who does this work at a fair rate for time spent. Mr. Towle's services are solely in the interest of the purchaser and is confined to used cars only.

Advertising Rates.

Five cents a word under all headings, payable in advance. Advertisements may be send "Care of Motor," and answers will be forwarded free of charge. No advertisement accepted for less than $1.

Second-Hand Cars for Sale

Under this heading second-hand cars are advertised for sale at the rate of five cents a word, cash in advance. These columns are open to dealers as well as to owners of private cars. If you have a car for sale, you can reach more prospective purchasers by a "Motor Messenger" in Motor than through any other American medium.

AUTOMOBILES $100 and UP. Our large illustrated red bargain sheet showing nearly sixty new and slightly used automobiles, from $100 to $700, will be mailed on application. Write plainly to O. Graham Cycle Co., 649-651 Madison St., Chicago, Ill.

FOR SALE—Cadillac model "B," 1905, fine condition; all oil and gas lamps, generator, horn, runabout deck, carry 5, rear entrance tonneau, $500. Address, Alfred G. Herrington, Mgr. Star Theater, Scranton, Pa.

CADILLAC, '04, rebuilt. Has 8-inch wheel base, illuding Gas Flash tires, rumble shoe, and lamps, $450. H. A. Pease, Torrington, Conn.

CLEVELAND, 24 H. P. TOURING CAR; Victoria leather top, glass front, and China Lamps; lights; cost $3,200; sell for $1,600, if taken at once. Howard, 1655 Broadway, New York City.

CLEVELAND, 1905, 4-cyl., 20 H. P. DEMONSTRATING CAR; guaranteed to be absolutely perfect condition, $1,800. List price $3,800. The Bennett Bird Co., 1404 Michigan Ave., Chicago, Ill.

COLUMBIA TOURING CAR, with top, in first class order; cost $4,000; will sell for $2,000, a bargain. Haynes touring car, with top, cost $3,500, will sell for $1,000. Franklin tonneau car, model B, cost $1,650, will sell for $850. Haynes runabout with top, cost $1,200, will sell for $700. All the above cars guaranteed to be in first class running order. Buffalo Automobile Exchange, Buffalo, N. Y.

CREST, 1905 tonneau, for sale cheap; canopy top, plate glass front, new; big bargain. B. F. Goldmar, Baraboo, Wisconsin.

ELMORE LIGHT TOURING CAR. No. 8 model, Detachable tonneau; 2-cyl; 8 H. P.; 1-cyl; 2 cycle engine; speed about thirty miles per hr.; 3 forward, one backward; cost $1,000; for selling. First check for $400 takes it. I. T. Boyd, Union College, Schenectady, N. Y.

1904 JACKSON TOURING CAR, side door entrance, 16 horse-power, fine condition throughout, $650. Oldsmobile with top, $300. 1905 Oldsmobile light touring car, model C, with two sets of makes fine runabout, cost $950, 30x3½ tires, $500. Many others. Michigan Automobile Co., Grand Rapids, Mich.

JACKSON, 1905, 20 H.P. side entrance car for sale, condition perfect, without stop, $850. Howard, 1655 Broadway, New York City.

KNOX, air cooled. Model "D," side entrance, 20 H. P., 2 cage top, glass screen, Rushmore searchlight, odometer, 3 extra casings, tools; now being overhauled; when done will be as good as new. Price $900, f. o. b. Portland. R. C. Payson, Portland, Me.

MITCHELL runabout, first class order, newly licensed 1906 and numbered. Reason for sale, too complicated for lady; great bargain, $550. F. E. Wilkes, 10 Hancock St., Troy, N. Y.

NORTHERN TOURING CAR, 1905 pattern, like new, great $1,200; a bargain at $1,000. Address R. A. E., 201 Franklin St., Buffalo, N. Y.

PREMIER, 1905, 4 cyl., 16 H. P.; we have three of these cars for sale at very attractive prices. The Bennett Bird Co., 1404 Michigan Ave., Chicago, Ill.

POPE-TOLEDO, 1905, 30-35 H. P. Cape top and speed-meter, in splendid order and runs like-new, $2,000. W. M. Smith, 29 W. 24th St., New York City.

RAMBLER RUNABOUT, 1905: '05 Holley carburetter; new tires, dos-a-dos seat; overhauled and varnished, $200. G. A. Powers, 547 Fulton St., Brooklyn, N. Y.

RUFFUM RUNABOUT, '05, 20 H. P., 2 speeds by sliding gears; thoroughly overhauled and repainted, $1,000. Harold Fish, Bridgeport, Conn.

PEERLESS, 24 H. P., 4 cyl., 4 speed, 1904 Model, side entrance, full lamp equipment, canopy top, glass front, extra tire, several tubes; just overhauled and refinished; cost $4,000; will sell for $2,000. Address H. Willis, 1 Gibbs St., Rochester, N. Y.

PEERLESS TWO-CYLINDER CAR; condition perfect and without a scratch. Everything practically new, extra fine hand-made canopy top and plate glass front; special brass hood; full equipment; $1,000 for quick cash sale. Geo. E. Cross, Louisville, Ky.

STEVENS-DURYEA, "R," four-cylinder, 30 H. P., in thorough condition, mandatory good as new. Will demonstrate to possible purchasers. Eastern Automobile Co., 326-340 No. Broad St., Philadelphia, Pa.

WINTON RUNABOUT, in fine running order, with dos-a-dos seat; no reasonable offer refused; will send photo or any information required. B. M. Wheelock, No. 46 Cross St., Lawrence, Mass.

1906 20 horse power gasoline, light touring car, with three cylinder, detachable tonneau; glass wind shield, fully equipped, new car in fine running order, $550. Owner, 115 Sheridan Ave., Pittsburg, Pa.

PEERLESS, 4-cylinder, touring car, extra tire, searchlights, horn, etc., in good condition; cost with extras, $3,000; will sell at a bargain; write for particulars and mention Motors. Phillips, 133 West 32d St., New York City.

1905 Royal Tourist Cars in excellent condition; will exchange for 1906 Royals; we have several of these cars for prompt delivery. C. A. Duerr & Co. (Incorporated), 1787 Broadway, New York City.

FOR SALE—Rambler Touring Car, single cylinder; all in good condition; in good condition; cost with for model B Cadillac runabout. Theo. F. Clark, Englishtown, N. J.

ANHARD, 15 H. P. Touring Car, 1903 model; new body; first-class condition; price, $1,100; The Auto Mart, 57th St. and 11th Ave., New York City.

THOMAS Single Cylinder Touring Car, seating five; sliding gear transmission; direct drive; very cheap. The Auto Mart, 57th St. and 11th Ave., New York City.

1905 THOMAS Car in good condition; 40 H. P. Harry S. Houpt, 733 Seventh Ave., New York City.

CADILLAC, model "B" run only 3,000 miles; tonneau; three seats; extras; tools, etc.; overhauled this spring and in first class; rock bottom price, $450. E. H. Davis, Evart, Mich.

BARGAIN—1904 White Steamer, in first-class condition; has been used very nearly one month used; thoroughly reliable; buy the best. Alfred L. Wilson, 103 Willer Ave., Columbus, Ohio.

FOR SALE, VERY CHEAP, Ford 4-cylinder; Ford 2-cylinder; White 2-cylinder; Stanley 2-cylinder; imported Rambler 8 cylinder; Orient Buckboard; motor for 1907 cars; also other cars; generally interesting; a card will bring the information. E. S. Youse, Reading, Pa.

WHITE Steamer, Limousine, 1905, 16 H. P., 4 cyl. Tools, lamps, and Hartford Suspension, in good condition, and has been overhauled by the White Co. A. C. Keene, 128 Lexington Ave., New York City.

AUTO, SPECIAL, 1906, 18 H.P., 3 cylinder, glass wind shield, clock, tonneau; best of condition and now guaranteed. Address A. B. Longacre, 512 Sheridan Ave., Pittsburg, Pa.

COMMERCIAL LOCOMOBILE STEAMER, 12 H.P., 2 cylinder, 1904 model. Victor Air and Water Pump. Burns kerosene, 7 miles to a gallon. Overhauled November, 1905. Price $800. Address H. C. Schierck, 286 Fifth Ave., Brooklyn, N. Y.

DURYEA, phaeton, make and break or jump spark; new run but little; nearly overhauled, fine condition; leather top; two solar lamps, oil tail lamp; tools and extra inner tubes. Cost without extras, $2,000; sell for $750. D. T. Green, Binghamton, N. Y.

FRANKLIN RUNABOUT, Rambler 1904. Olds Run about 1904, Holsman 1905, and others. East Liverpool Automobile Co., East Liverpool, Ohio.

COMPLETE Hayes-Argenzo Runabout Parts, 15 H.P. engine, etc. Box 28, Slatersville Refining, R. I.

FOR SALE, 1905 Holsman Surrey with top; run very little; party wants a 40-H.P. car; selling for no fault. First check over $800 takes it. H. H. Knowles, East Liverpool, Ohio.

MITCHELL, Model 2 B, 1906, 10 H.P., 2 cylinders, extras; 2 solar lamps, tube, horn, rear large bumper; 2 tone model of exceptional and took that in exchange for new style. Price $750. Ray S. Dean, Sank Centre, Minn.

KNOX, 1904 Runabout, 8 H.P., one cylinder, Swinehart tires, guaranteed in perfect condition. Reason for selling; have purchased larger car. Price, $600. Address A. P. Ordway, 341 West 57th St., New York City.

OVERLAND, 1906 Runabout, 8 H.P., 2 vertical cylinders; run 150 miles; guaranteed perfect tires, not scratched; one extra inner tube; pump, lamps, rings and a few tools; will take $425 cash. Address F. H. Howard, 56 Galen St., Watertown, Mass.

For advertisements received too late for classification see the last five advertising pages.

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250 AUTOMOBILES

Prices Cut to the Quick

A good auto at a low price means a quick sale. That is why we are always hammering down prices. With over 250 autos always on hand, we have what you want and can save you from 25 to 40 per cent. on the prices asked by others. As the largest dealers in America we make the most liberal offers.

150 Tonneaus $325 to $5,000

Jackson, 2 cyl., $650; Franklin, 4 cyl., $850; Side entrance Winton, $1,650; Pope Toledo with top, $1,600; Rambler, 2 cyl., $750; National, 4 cyl., $850; Wayne Touring Car, 4 cyl., $1,250; Durbrad, 2 cyl., $950; Yale with top, 4 cyl., $650; Mercedes, 4 cyl., $2,000; Lone Tonneau Car, 4 cyl., $1,850; Yale with top, 4 cyl., $650; Berg, Limousine body, almost new, $1,750; Packard, 4 cyl., $1,000. Over 100 others all marked for quick sale.

Runabouts, Electrics, Steamers

All makes of electrics, $200 up; runabouts, cabriolets and tonneaus, Mobile, Prescot and Pope Toledo steamers, $175 up; Rambler, Knox, Olds, Auto Car and other runabouts, $200 up. 30,000 feet of floor space constantly crowded. More cars under this one roof than you will find in all the rest of New York. If you cannot call, send for list.

MANHATTAN STORAGE CO.

Largest Auto Dealers in the World

334-340 West 44th St.

2 blocks from 42d St. Station 9th Ave. "L." 3 blocks from Broadway.

LOCOMOBILE STEAMER, 1902 model, 45 H.P., 2 cylinders; in good running condition; extras; will be demonstrated; have bought larger car. Puna Eates, 212 Summer St., Boston, Mass.

WILL SELL my 1905 Model "F" Locomobile 15—20 H.P., as I am ordering one of the 1906 models of this make; car has been run about 4,000 miles very carefully and under personal supervision; will be supplied with extra outer shoe, spare armature, batteries and coil. Machinery and tires in excellent condition, body and chassis, maroon enamel with gold. Address J. T. Roche, Jr., Bridgeport, Conn.

PANHARD, 1904, 18—24 H.P., 4 cylinders, extras, 4 lamps, horn, cape cart, Mabley, Prescot and Panhard touring body by Quimby. All in first-class condition. Price, $2,500. Address S. E. H., 325 Walnut St., Philadelphia, Pa.

PEERLESS, Model No. 9, 1905, 24—30 H.P., 4 cylinders; top, lamps, horn, Warner Speedometer, Mayfly tonsil, elegant condition. New, August, 1905. Cost, $5,000. Will sell for $2,250 cash. Frank E. Stoneman, 1° O. Box 561, Columbus, Ohio.

RENAULT, 1905, 24—30 H.P., 4 cylinders, with acetylene tank, tools, canopy top, lamps, horn and glass back of driver's seat. Sell for $4,500 cash. Ask for Mr. B.'s car at the Majestic Garage, Broadway and 74th St., New York City.

KNOX SURREY, Model F, 1905, 16 H.P., 2 cylinders, cape top, tools, two new tires, never used; other extra parts. Condition guaranteed perfect. Address A. P. Ordway, 241 West 37th St., N. Y. City.

FOR SALE, 20 H.P., 1903 model Winton. Perfect condition. Price right. Address C. W. Booth, Ware, Mass.

WINTON, 1903, 20 H.P., will sell; extra tire, lamps, horn and tools complete. Fine running order. Reason for selling, owner has two. Write for price. C. W. Booth, Ware, Mass.

COLUMBIA Touring Car FOR SALE

Mark XLIV, 18 H. P., 2 cylinders opposed. Three speeds, Sarachbild-gear, bicycle seat, brass oil lamps, seven tire shoes, and four inner tubes. Car in the prime of condition. Price, $1,000 f. o. b. Waterbury. Address, Geo. A. Driggs, Waterbury, Conn.

NEW, large side-entrance limousine body for sale, $1,000; upholstered finest of leather; also new detachable limousine to fit Model "F" Ford touring body, $100. One limousine body in the rough for sale cheap. Address F. C. Griffithe, 40th St. and Broadway.

E. V. CO. electric for sale. Recently overhauled and painted; in perfect condition; cost $1,800; sell as new. Brougham for sale at a reasonable price. Address L. C. W., 244 West 99th St., New York City.

ELECTRIC COUPE, 1905 model, newly painted in best of condition, E. V. Co. For sale reasonably. Address L. C. W., 244 West 99th St., New York City.

NO. 450, Model "F" 1905 LOCOMOBILE, 25—30 H.P. touring car, in perfect condition. Thoroughly overhauled in December and put up for the winter. Repainted. Full equipment and in addition, cape top, searchlight, Jones Speedometer-odometer, rear basket, clock, Hartford suspension and two new-wood mounted shoes. Car at Locomobile Establishment, No. 15 Berkeley St., Boston, Mass. Owner, L. S. Bigelow, No. 37 Madison Ave., New York City. Sold because owner is buying larger Locomobile. Demonstration in Boston. Price complete, $2,200.

AUTOMOBILE BARGAINS

We are the largest dealers in new and second-hand automobiles in the world.

Brand new **Oldsmobile French Touring Runabouts,** 1905 MODELS, $490; regular price, $750. Brand new 20-H.P., two-cylinder **Oldsmobile Touring Car,** 1905, SIDE ENTRANCE, price, $775; regular price, $1,400. We name a few 1905 cars on hand: 45-H.P. **Pope-Toledo; Packards; Wintons;** 15-20 **Locomobiles; Rochet Schneider; Ramblers; Cadillacs; Oldsmobiles; Haynes-Apperson; Reliance; Queen; Pope-Hartford;** also Model "A" **Cadillacs** and Model "B" **Cadillacs,** and every other make of first-class automobiles at prices ranging from $100 to $5,000. No matter what you are looking for you are sure to find it at our place. Remember we are the largest dealers in the world and carry in stock at all times from 200 to 300 machines of various makes.

Complete bargain sheet sent on request

TIMES SQUARE AUTOMOBILE COMPANY

164 West 46th Street 2 doors East of Broadway **New York City**

FOR SALE—A new 45-ft. open Gasoline Launch, high crown decks, 4 cylinder, 25—30 H.P., Leighton engine. Fast boat at just half cost. Investigate Box 592, Syracuse, N. Y.

FRANKLIN, 1904 Runabout, 12 H.P., 4 cylinders, extras; Dietz 7-in. lights and generator; Sansom rear tires, storage battery, glass front, canopy top. In very good condition, newly overhauled, new wiring and clutch. Tonneau can be attached, $800. Peter Smith, P. O. Box 256, Newark, N. J.

ROYAL MOTOR CYCLE, 1½ H.P., chain drive, 13½ in. Fish tires, all in good running order. For sale reasonably. Arthur Flessel, Huntington, N. Y.

FRANKLIN, 1905, Model "E" Runabout, 12 H.P., 4 cylinders; extras, Jones Speedometer, Veeder Odometer, one extra shoe case and brackets, five extra tubes and case, 8-in. Rushmore headlights and generator, and other tools and extras. Just overhauled, cost with extras, $1,800; sell for $1,100. Address P. O. Box 7, Syracuse, N. Y.

PACKARD, detachable tonneau, 18 H.P., one cylinder, 28 extras, two oil lamps, gas lamp, horn, inner tube, two baskets. In use at present. Engine and transmission have been just overhauled; sell for $375 f. o. b. New York. Apply F. McGuire, 327 Fourth St., Weehawken P. O., N. J.

CARLSON Auto Co., 1060 Bedford Ave., Brooklyn, N. Y., have just completed our repair shop and we are now ready to do all kinds of difficult repairs. Bore cylinders, make pistons, fit new bearings, etc., on all makes of cars. Try us. Best work at lowest prices. Also have second-hand cars at bargain prices, but no junk. Every car has been rebuilt and repainted by us before offered for sale and therefore we guarantee conditions of same. Try us. CARLSONS, 1060 Bedford Ave., Brooklyn, N. Y.

FRANKLIN, 1905 Model A, tonneau, 12 H.P. rated, but has proved nearer 20 H.P.; 4 cyl., French horn, Odometer, new rear shoe and tube, searchlight 7 in.; perfect condition, newly varnished and overhauled. Address Lock Box 1092, Patton, Pa.

PEERLESS, 1904, touring car, 24 H.P., 4 cylinders, canopy top, glass front; just overhauled; tires, motor, and finish in good condition. Will sell for $2,000. H. W. Clarke, care of State National Bank, No. Tonawanda, N. Y.

PANHARD, 1906, Model, long chassis; side entrance body; never been used; good reason for selling price reasonable. Address H. B. L., Box 27, care of Morose.

MICHIGAN, 1906, Model "D," light touring car, extension top, lamps, etc.; brand new car, perfect condition; price $950. Address M. B. L., Box 485, Kalamazoo, Mich.

MERCEDES, 40 H.P., side entrance; top and full equipment like new; must be sold at once to settle an estate. F. M. Simons, 515 Seventh Ave., N. Y. City.

RENAULT, 14-20 H.P., Kilner Limousine body; just thoroughly overhauled and repainted; splendid opportunity for party wanting city and touring car in one. E. R. Church, 140 West 42nd St., New York City.

FOR SALE

Peerless 24 H. P. Bought July, 1905. Newly painted and overhauled. Guaranteed perfect condition. Fully equipped with lamps and lamp covers. Warner Speedometer, Veeder Odometer, Gabriel horn, rear basket, 5 inner tubes. For further information, address G. W. Carroll, Norwich, Conn.

SPECIAL to Winton Owners—Use the Carlson system of ignition on your 1903 cars. Guaranteed to be perfect, consisting of the following, which will cost you at any other place: Four-cylinder vibrating silk round coil, $25; batteries and wiring, $25; commutator, gear and parts ready to fit on Winton C's and B's, $35, which makes it the cheapest you can get it anywhere, $105. We will sell this outfit complete, with the Carlson commutator, which is guaranteed not to wobble, for the price of $70. We will put in 0.0 for $5 extra, providing the car is run to our shops. We will also fit a Holley carburetor to your car for the sum of $18. Look us up, it will pay you. Winton overhauling our specialty, cylinders bored and ground, new pistons made, prices reasonable. If you want to buy a second-hand car, see our 1905 Wintons that have just been overhauled and repainted like new; great bargains; no junk sold. CARLSON AUTO CO., 1060 Bedford Ave., Brooklyn, N. Y., WINTON AGENT.

RELIABLE AUTOMOBILES

AT BARGAIN PRICES

Locomobile, 4 cyl., $750 to $2,000 Stearns Touring Car, $1,000. Oldsmobile Runabout, $125. Oldsmobile Tourabout, $425. Decauville, 4 cyl., 20 H.P., $1,200. Rambler, Side entrance, $650. Cadillac, 4 cyl., 10 etc., $1,500. Peerless, 1905, 4 cyl., 24 H.P., $1,000. Autocar, 4 cyl., $1,100. Autocar, 2 cyl., $600 Locomobile, 2 cyl., $700. De Dietrich, 30 H.P., $3,000

Fifty others. All cars subject to a satisfactory demonstration.

BROADWAY AUTOMOBILE EXCHANGE

513-515 Seventh Avenue -.- NEW YORK CITY

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Second-Hand Cars Wanted

Under this heading wants of second-hand cars for cash or exchange are inserted at the rate of five cents a word. Since Motor is read by all dealers in second-hand cars as well as by more private car owners than any other motoring paper, a "Motor Messenger" in this column is more certain to obtain for you just the car you want than any other kind of advertising.

BAKER ELECTRIC WANTED, Stanhope preferred. Will consider runabout if must be in good condition, and cheap for cash. B. Adams, 23 Washington Place, East Orange, N. J.

WANTED.—1905 motor cycle in first class condition; must be perfect. Quote lowest cash price, and give particulars. F. M. Pierson, 308 S. 6th St., Terre Haute, Ind.

WANTED,—18 or 24 H. P. Panhard 1904 or 1905 model, in good condition; not particular as to appearance; will pay spot cash for the right car. Address, C. T. B., 470 East 17th St., Brooklyn, N. Y.

WILL exchange, for a good steam commercial wagon or passenger truck or car, a Cornell, best of condition; many extras. For further particulars address J. D. Grob, Bentley, Ala.

WANT to buy a hotel bus, new or second hand, gasoline, steam or electric. Address H. F. Broyles, Greenwood Springs, Miss.

Cars for Rent

Under this heading advertisements of motor cars and motor boats for hire are inserted at the rate of five cents a word. Every motorist having a car for rent should keep a "Motor Messenger" running in this column. Motor is the only motoring paper published that has any large circulation among that portion of the general public that does not own motor cars.

BOUTON MOTOR COMPANY,
AUTOMOBILE rental service; four-cylinder touring cars exclusively; garage and salesrooms. M. D. Bouton, president; Frederick A. Tanner, treasurer; James H. Scott, superintendent. Phone 2958 38th St. Address 220 West 41st St., New York City.

TOURING CAR FOR RENT.—Large private car by the hour, day or trip. Edith L. Mayer, 1405 Broadway, Times Square, New York. 'Phone 1724 38th St.

AUTOS FOR RENT.—Day, hour or trip. M. J. Venie, 154 West 42d St., New York, or 'Phone 6782 38th St.

FOR RENT.—Fine new Jackson cars. The Jackson Agency, 143 West 29th St., New York.

THE swellest autos to hire in New York are the new four-cylinder Packard touring cars. Private tours anywhere. I cater to the select trade of New York. F. Lauerhass, 1588 Broadway. 'Phone 2668 38th St., New York City.

Motor Car Supplies and Accessories

Under this heading are advertised, at the rate of five cents a word, all kinds of motor supplies, parts and accessories. Motor is more widely read by car owners than any other motoring paper, and is therefore the best medium in which to advertise motor car supplies.

FOR SALE CHEAP,—18 inch Locomobile Boiler, nearly new. Address, 249 N. Broad St., Philadelphia, Pa.

WANTED,—1-35, 2 or 3 H. P. Gasoline Motor complete (second hand). Address C. E. C., care of Motor.

WHITE FLASH BOILERS, with water regulator and thermostats, \$60 each. 14-in. and 16-in. Loco and Tenders boilers, second hand. Portland Garage, Portland, Me.

IF you are having trouble with your radiator, write for our circular describing the very best cooler made; quick delivery. Feeders Manufacturing Works, Buffalo, N. Y.

HONEYCOMB radiators, mud guards, hoods, tanks, aluminum bracing, sprocket covers, repairing of all kinds. A-Z Co., 462 Eleventh Ave., New York. Call or phone 2194 38th St.

SHEET METAL SUPPLIES. Specialties. Feddess Manufacturing Works, Buffalo, N. Y.

AUTO TIRES AT HALF PRICE.
WRITE TO-DAY.
A. H. KASNER,
152 Church St. - - - New York.

PROTECT YOUR AUTOMOBILE WITH A MUD APRON. A-Z Co., 462 Eleventh Ave., New York, N. Y. Call on or 'phone 2194 38th St. Send postal for blotter giving full information.

IF you are disgusted with the lamps you have been using, send word something different and better than anything on the market, address, AUTOMOBILE BROKERAGE CO., 140 West 42nd St., New York City.

ELECTRIC supplies, Witherbee Igniter Co., 541 West 43d St., New York City.

TIRES FOR SALE.—Bargains, 34x4, 36x5, 28x3½, 30x3½. Geo. Hylton, 1182 Bedford Ave., Brooklyn, N. Y.

AUTOMOBILE polish; how to make it. Send stamp for circular B. J. S., 371 Grant Ave., Brooklyn, N. Y.

SOMETHING DIFFERENT.
In lamps, both oil and gas. Handsomest lamp on the market, price reasonable. Designed by one who has used the other kinds.
AUTOMOBILE BROKERAGE CO.,
140 West 42nd St., N. Y. City.

Agents

Under this heading will be accepted advertisements of agents of the various makes of cars. Also descriptions of new cars for sale, notices of agents, salesrooms, etc. This will be a very useful guide to out-of-town owners when making trips into town. Advertisements will be accepted at the rate of five cents a word.

CENTRAL PARK AUTOMOBILE STORAGE CO.
Central Park West and 110th Street, New York.
Agents for
SPEEDER CARS.
Storage, Repairs, Supplies and Electric Charging.

HATCH & COMPANY,
AGENTS for COMPOUND CARS, strictly high grade; 16 hp Runabout, \$1,400. Light touring, \$1,400. Doctor's Stanhope, \$1,400. Royal Victoria, \$1,700. Address, 1655 Broadway, N. Y. City. 'Phone, 3928 Columbus.

HICKS AUTOMOBILE COMPANY,
1384 BEDFORD AVE., BROOKLYN, N. Y.
AGENTS FOR
REO MOTOR CARS.

PIERCE-RACINE
two cylinder touring car,
12-14 h. p., \$850;
four cylinder touring car,
24-28 h. p., \$1,750.
GANTERT & PAUL, AGENTS,
'Phone, 3725—Harlem. 60, 62 West 116th St.

MITCHELL
Gasoline Trucks and Delivery Wagons.
MITCHELL, CORNELL & KIELE COMPANY,
Broadway and 49th St., New York City.

Repair Shops

Under this heading will be accepted advertisements of Gear Cutters, Braziers, Tire Repair Shops, Vulcanizers, and all other general repair shops for automobiles or accessories. The rate is five cents per word.

W. M. SHARPE,
VULCANIZING; all makes of tires and rubber goods repaired; auto tires repaired; old tires bought. 118 West Broadway, New York City.

LOOK HERE.
IF you want a good 2d-hand auto tire, I carry the best, and have other kinds to suit you in New York. All sizes at prices that will interest you. VULCANIZING. All makes and sizes of tires repaired and re-covered. GUARANTEE EVERY REPAIR. Write for repair price list. W. M. SHARPE, 118 West Broadway, near Dunne St., New York City.

WANTED, your automobile tires to retread or repair, all kinds of vulcanizing. At 56 to 56 less than factory prices; new auto tires at greatly reduced prices; also Kettle Vulcanizers for sale. A. T. Mosher, Anderson, Indiana.

HAVE your tires repaired by the EAGLE TIRE RE-PAIR CO. Call or write. GUARANTEED. We carry a large stock of second-hand recovered shoes which are as good as new. See them before you buy elsewhere. 1605 Broadway and 686 Washington St., New York City.

SEE PREMIER TIRE COMPANY
303-305 West 58th St. Branch, 847 West 56th St.
Retreading and vulcanizing by experts only. We will not recover a shoe, if after a thorough examination by our rubber expert, we find it will not stand the wear. All makes of new shoes and tubes for sale. Investigate. Telephone, 6432 38th St.

TIRES of all kinds repaired at Geo. Hylton's, 1182 Bedford Ave., Brooklyn.

GEO. HYLTON, 1182 Bedford Ave., Brooklyn. Repairs all kinds of tires. Good used tires for sale.

TIRES REPAIRED, VULCANIZING.
All makes of foreign and domestic tires promptly attended to at reasonable prices. Retreading a specialty. Work guaranteed. HUNT & THINNES, 220 West 30th St., N. Y. City.

RUBBER TIRE VULCANIZER.
All makes of domestic and foreign tires repaired promptly. Expert workmanship guaranteed. J. A. HARRISON, 1555 Broadway, New York City. 'Phone, 2757 Bryant.

SIER BATH CO.,
125 West 49th St., New York City.
Automobile machinists.
French and American gear cutting.
'Phone, 2093 Columbus.

MANHATTAN BRAZING WORKS.
CAST IRON BRAZING. We make a specialty of brazing cylinders, gears and machinery of every description and all other metals. WE ABSOLUTELY GUARANTEE THE WORK WE DO. 112 Reade St., cor. West Broadway, New York. Tel. 3010 Franklin.

SEND for a list of references from the people for whom we have done brazing; twenty-five of the largest firms in New York on the list. Manhattan Brazing Co., 112 Reade St., New York.

AUTOMOBILE REPAIRING.—Consult the Auto Mart before overhauling your automobile this winter; we can save you money; repairing of every description; gear cutting a specialty. The Auto Mart, 37th St. and 7th Ave. 'Phone, 4062—38th.

Garages

Under this heading notices of storage, repairing, electric charging, etc., are received from garages at the rate of five cents a word. A "Motor Messenger" in this column will bring your garage to the attention of more motor-car owners than any other publication.

YOU AUTO
store with us; new station, low rates, best service; machine and electric work. Knickerbocker, 253-5 West 64th St., New York City.

Open for Business.
THE PALACE
AUTOMOBILE AND MACHINE CO., Inc.,
124 to 128 West 124th St.
AT SEVENTH AVE. DRIVE.
'Phone 4844-4845 Morningside. NEW YORK.

CARS stored and repaired at lowest reasonable prices. Terms: By the job or by the hour. All work guaranteed. Auto Transportation Co., 309 West 41st St., New York City.

MANUFACTURERS' MOTOR CAR CO.—Sales, storage, repairs, supplies. 54 and 56 West 43d St., New York City.

PROSPECT PARK AUTOMOBILE CO.—Largest and most complete garage in Brooklyn. 918 and 920 Union St. 'Phone 969 Prospect.

PASTRES' AUTOMOBILE GARAGE, corner of Ocean Parkway and Sherman St., opposite Bader's Hotel. Telephone 1813 Sheepshead. Branch 83-87 Stanton St., corner of 13th St. Telephone 404 R South, Brooklyn.

UTICA AUTO STATION, 52-54 W. Utica St., Buffalo, Jas. V. Reilly, Starter. Automobile Motor League, fully equipped garage, charging, machine shop. No. 1 auto depot.

AUTOMACHINE CO., 48 Wenfield Ave., Ellisheth, N. J., agents for the Buick. Best equipped repair shop and garage in Elizabeth.

CENTRAL AUTO STATION.
238-240 West 56th St., New York City.
AUTOMOBILE STORAGE.
Gasoline and Electric Machines. 'Phone 887 Col.

Situations Wanted

Chauffeurs desiring positions can do no better than to let the fact be known by a "Motor Messenger" in this column at the rate of five cents a word.

A MERICAN, 21 years of age, six months' experience on road and in shop, wishes position with private party or business house anywhere, gasoline and electric machines. F. J. Diskin, 642 Tenth Ave., New York City.

A MERICAN, single, 29 years old, worked 18 years as an machinist, Pennsylvania Railroad references; one year as chauffeur and repair man, wishes position as driver with boss. \$100 per month—honest, sober, and industrious. Address W. B. Munger, Glen Cove, L. I.

AUTO ENGINEER, experienced careful driver, thoroughly competent, trustworthy, reliable, good practical mechanic, certificate by Civil Service examiners, operate and repair foreign and domestic cars; city references. Americus, 1 Lexington Ave., 27th St., New York City.

BRISHMAN, 5 years' experience as repairman and driver, wishes position anywhere; can run any car; married. Address O'Toole, 312 W. 41st St., New York City.

CHAUFFEUR, registered, speaks several languages, experienced on Wolseley-Siddeley gasoline cars; honest, reliable man; first class written references, Chauffeur, 1101 Pacific St., Brooklyn, N. Y.

YOUNG man, good education, is not afraid of work, wishes position as chauffeur; has had 3 years' experience in automobile mechanician; will go any place; character, A1 reference. William Cummings, 169 E. 40th St., Chicago, Ill.

YOUNG man, 22, understands running and repairing of gasoline cars; has experience and best of references. Dwight L. Smith, 113 Oak St., Jersey City, N. J.

BRISHMAN, experienced on gasoline cars, wants position, Michael Sullivan, 51 Third Ave., New York City.

YOUNG AUSTRIAN, 3 years as chauffeur on various American cars, wishes position anywhere as driver and repairman; salary \$25 per week. Address John Skinta, 609 St. John's Place, Stamford, Conn.

YOUNG man, 25, recently in business for himself, wishes position running Pope-Toledo car or Peerless; good references; Scotchman. Address, W. White, 56 Fourth Ave., Brooklyn, N. Y.

YOUNG Italian desires position with private family as chauffeur, coachman and teacher of Italian; thoroughly competent. Address Tocasca, 119 Macdougal St., New York City.

For advertisements received too late for classification see the last few advertising pages.

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AUTOMOBILE owners desiring experienced men will be supplied with a selected list and full information by sending $1 to the Chauffeurs' Registration Bureau, 1789 Broadway, New York City.

Professional Chauffeurs' Club of America
(INCORPORATED.)

If you are in need of a competent Chauffeur, kindly notify us by mail or 'phone, and we will gladly supply same without charge to either party.

Phone 2498 Columbus 1773 Broadway, New York City

AUTOMOBILE TRADE.

YOUNG MAN, with several years' practical experience as salesman, bookkeeper of French and German cars and accessories, desires position with first-class concern; satisfactory references upon request. Erik J. F. Pell, 317 West 124th St., New York City.

CHAUFFEUR, 25, licensed, desires situation with private family or in a shop, anywhere; good references. Address E. Leuthner, 315 Central Ave., Jersey City, N. J.

YOUNG Frenchman, well educated, speaking English, desires an office position; has import and export house. Preferably in or about New York City. At present employed as a bookkeeper, but would prefer a position not quite so confining if possible. Can furnish bond if required and the best of references from my present employers and from France. Address with full particulars, Frenchman, Box 12, care Motor.

A MERICAN, gentlemanly bearing, good address, wishes position as chauffeur in private family. Ability. City or country. Address G. Pohlman, 17 Cliff St., New York City.

AUTOMOBILE CHAUFFEUR, 5 years' European experience on high-power cars, wishes position in New York City. Will travel. Is a native of America. Speaks French, References. Louis R. Duval, 226 West 29th St., N. Y. City.

CHAUFFEUR, first-class machinist, experienced on gasoline cars; does repairing; position with private family. First-class references. Will go anywhere. Henry Ahnert, 417 Central Ave., Jersey City, N. J.

CHAUFFEUR, licensed, to repair or operate all cars, desires position; references as to character and ability. Address L. M. T., 134 South St., Newburgh, N. Y.

CHAUFFEUR, with road experience, wishes position preferably in New Jersey or New York. References; experienced on Rambler, Pierce, Peerless and Cadillac, but can run any gasoline car. Address G. F. Jackson, 409 Chestnut St., Roselle Park, N. J.

EXPERIENCED CHAUFFEUR wants position with private family coming season. Good references. C. E. Wilkinson, Potsdam, N. Y.

IRISHMAN, 28 years old, wishes position as chauffeur, preferably of near New York City. References. Experienced on gasoline, steam or electric vehicles. Address D. Hennell, 428 West 44th St., New York City.

YOUNG ITALIAN, valiant and competent chauffeur and coachman, needs position. Excellent driver; will travel. Address Terrara, 41 Bedford St., New York.

YOUNG MAN, with 4½ years' experience, evenly divided between the shop and road, wishes a position on any gasoline machine. Can make any repairs. Best of references. Registered in New York State. D. A. Sanders, Nyack, N. Y.

CHAUFFEUR, 21 years of age, with good references, two years' experience, wishes position at $75 a month. Will go anywhere. Address Mortimer Seefeld, Ridgefield, Conn.

GERMAN-AMERICAN, has worked for several auto companies in New York, wishes position. Salary, $80. Address Wm. J. R. Menger, 1244 Second Ave., N. Y. City.

CHAUFFEUR, 2½ years' experience, German, married, wishes position as driver; $25 per week reference. Leo Pulasky, Locust St. and East 13th St., Brooklyn, N. Y.

A MERICAN, 4 years' shop and 2½ years' road experience, wishes position as driver; all gasoline cars; wages $100; will go anywhere. Fred Wernli, 402 West 50th St., New York City.

YOUNG American desires position as chauffeur; three years' experience in repair shop and one year on road. Address Jas. S. Conners, Somerville, N. J.

YOUNG man wishes position as driver and repairman with private party; references and experience; salary. Write for information. W. J. Trempe, Wilder, Vermont.

For Exchange

A new Department sure to produce results. Every motorist has surplus accessories. Exchange them for something useful. Five cents a word.

WANT to buy, sell, exchange? All makes and models almost new. Manhattan Storage Co., 334 West 44th St., New York City.

FOR SALE—1 x 2 camera, Pony Premo No. 6; has Voightlaender Collinear Lens with iris shutters and diaphragm. Portland Garage, Portland, Me.

WILL EXCHANGE for 5 good steam commercial wagon, a passenger truck or car; a Conrad; best of condition; many extras. For further particulars, address J. D. Greb, Easley, Ala

WANTED TO EXCHANGE, new canopy top Surreys for an automobile. Address W. W. Embly & Co., Asbury Park, N. J.

CLAUDE LORAINE LANDSCAPE, genuineness guaranteed by French Government, for sale for $2,000, or will exchange for automobile worth as much. Address "Collector," Box 23, care of Motor.

AUTO wanted in exchange for 500 acres of timber land in Scott County, Tenn.; clear title; no incumbrances. Address Box 131, St. Ansgar, Iowa.

WANTED.—To trade for surrey car a 12 H.P. Shelby opposed piston, drop-front seat; has a broken crank shaft. Address Harlem, care of Motor.

Miscellaneous Announcements

Under this heading we are prepared to print "Motor Messengers" for other than trade advertisers who have a real message to deliver to motor car and motor boat owners and users. The charge is only five cents a word.

WANTED.—Some responsible individuals or concerns to act as local sales agents in New York and nearby cities for a well-known boat and engine manufactory. State experience, if any. Address P. C., Box 54, care of Motor.

A N established New York firm of ample capital and large selling ability, owning and operating the most completely equipped fire-proof garage in the United States, will consider proposition for the agency in this locality of a foreign and also a high-grade American car. This is an exceptional opportunity for the proper party. Address Howard, care of George Batten Co., Potter Building, New York City, for full particulars.

E. C. CHURCH,
140 West 42d St.,
New York City.
Automobile Expert,
Dealer in high-grade second-hand cars.
'Phone, 5401 Bryant.

IF YOU INTEND TO BUY

A NEW CAR OR REMODEL YOUR PRESENT ONE,

let me advise you. I have no connection whatever with any automobile manufacturer, and my opinions are unprejudiced and reliable.

Complete cars, motors and transmissions also designed and built. 7 years' experience.

H. McGEORGE, - Cynwyd, Pa.

MR. HERBERT L. TOWLE,
130 Nassau St., New York City.
Automobile Expert, Consulting Engineer.

THE WITHERBEE IGNITER CO. begs to inform the public of its change in address to No. 541 West 42d St., New York City.

A LEADING foreign manufacturer of Automobiles desires to arrange with an American company to reproduce his models in the United States. Complete samples can be supplied, also full sets of blue prints of every part. His line consists of two up-to-date models as follows: Two cylinder 16 H. P., four-cylinder vertical 24 H. P. Any parties in the position to interest a strong company in the manufacture of these models in the United States, please address C. C. M. C., Box 125, care of Motor.

Automobile Insurance

Under this heading will be accepted advertisements of Insurance Companies, Agents, etc., at the regular rate of five cents per word. Accident, fire and liability agents can find no better place to reach the automobile public than in this column.

Automobile Insurance

Boston Insurance Co. Capital $1,000,000

Policy covers car wherever it may be in U. S. or Canada, against fire from any cause, explosion and lightning included; also marine and transportation risks, theft or pilferage, upon most favorable terms. For further particulars apply to

H. W. BEALS

76 William St. New York City

Telephone, 3434 John

For advertisements received too late for classification see the last few advertising pages.

Instruction

Under this heading are inserted, at the rate of five cents a word, all advertisements of reading and corresponding automobile and motor boat schools, as well as notices of motoring books and other publications.

MANHATTAN AUTOMOBILE SCHOOL.—Instruction by experienced teachers who are mechanical engineers with M.E. degree from Cornell University. 315-321 W. 99th St., New York. 'Phone 5659 Riverside.

AUTOMOBILE INSTRUCTION. — Only practical school of automobile instruction. Our courses fit you to become an experienced chauffeur with full knowledge of how to keep your machine in order. Thorough practical work only. Chelsea School of Automobile Instruction, 318 West 57th St., New York City (near 10th Ave.). 'Phone 3081 38th St.

SCHOOL FOR CHAUFFEURS.—Ours is the original school of automobile instruction. Our unparalleled success has made many imitators. By our thorough individual work under personal supervision of the manager, we guarantee that every student not only is a chauffeur, but a thoroughly competent mechanic able to make repairs on any machine and to keep it at all times in perfect order. Satisfaction guaranteed. Positions waiting. Wall Street Automobile Transportation School, 309 West 41st St., New York, N. Y.

NEW YORK SCHOOL OF AUTOMOBILE ENGINEERING, 141 WEST 42ND STREET, NEW YORK CITY.

THOROUGH INVESTIGATION—Which is invited—will prove this the only high-grade, completely equipped school for automobile instruction. Instruction under personal direction of Prof. Chas. B. Lucke, M.E., Ph.D., School of Engineers, Columbia University. Departments include Machine Tool and Forge Shops, Assembling and Test Shop, with every type of motor; also Laboratories specially equipped to teach all component parts of automobiles. Ability of graduates assured. Day and evening classes. Special courses for owners.

Help Wanted

Since all the best chauffeurs are regular readers of Motor, a "Motor Messenger" at five cents a word is the surest means of obtaining a satisfactory chauffeur.

THE CHAUFFEURS' REGISTRATION BUREAU offers the only opportunity by which experienced chauffeurs are placed in communication with automobile owners, garages and dealers, including instruction by Motor; no further charge; send stamp for registration blank and further information to CHAUFFEURS' REGISTRATION BUREAU, 1789 Broadway, New York City.

Hotels

As hundreds of motorists are readers of Motor, Hotels that cater to such people can do no better than insert a notice in this column at five cents per word.

HOTEL GRAMATAN, Lawrence Park, Bronxville, N. Y.—Opened June 1 and will remain open all the year. Most palatial hotel near New York; 15 miles from Grand Central Station; golf, tennis, riding, driving, etc.; refined, quiet, exclusive; capacity, 400; fine orchestra; long distance telephone in every room; booklet. J. J. Lannin Co., proprietors; also proprietors Garden City Hotel, Long Island.

Advertisements received too late for proper classification

GROUT, steam surrey for sale, 1905 model, cost $850. What am I offered for same in A1 condition? North Ave. Auto Exchange, 1423 North Ave., Bridgeport, Conn.

80 ACRES good eastern Nebraska land, to trade for good second-hand touring car and some cash. Address J. C. B., Box 81, care of Motor.

CHAUFFEUR, German, married, aged 32, licensed, experienced, strictly temperate, wishes position; city or country. W. Rose, 135 East 124th St., New York City.

CHAUFFEUR, five years' experience, two in shop and three on road and demonstrating; familiar with all cars. O. R. Hutchinson, New Lenox, Mass.

CHAUFFEUR desires position, reliable man of good habits; speaks three languages; able to operate and take care of gasoline cars. References. Address Joseph Bielick, 48 Elizabeth St., West New Brighton, S. I.

WANTED traveling salesman to sell automobiles engine parts; one with some mechanical knowledge regarding automobiles preferred; to be experienced and references. Address P. O. Box 876, Cincinnati, Ohio.

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MOTOR STATION DIRECTORY

New York City

AUTOMOBILE ARCADE, 49th St. and Broadway.
AUTOMOBILE EXCHANGE & STORAGE CO., 123 West 38th St.
A. G. SPALDING & BROS., 29-31 West 42d St.
A. F. RIKER, 200 West 76th St.
AUTO TRANSPORTATION CO., 309 West 41st St.
AUTOMOBILE BROKERAGE CO., second-hand cars, 149 West 42d St.
AUTOMOBILE RENTING AND TOURING CAR CO.: Hartog & Rappleyea, props., 304 West 54th St. 'Phone 1464 Columbus.
AUTOMOBILE DEPOT, INC., 231-235 West Fortieth St. 'Phone 2176 and 2177 Bryant.
AUTOMOBILE SCHOOL OF NEW YORK, Forty-ninth St. and Seventh Ave. 'Phone 2531 Columbus.
AUTO IMPORT CO., 1786 Broadway. 'Phone 4637-4638 Columbus.
AUTOMOBILE HIRE AND SALES CO., 231-235 West 40th St. Phone 144 38th.
A-Z CO., 154-156 West 37th St.
BLUE RIBBON GARAGE, 111-114 East Seventy-fifth St. 'Phone 78-270.
BLACK DIAMOND AUTO CO., Lord's Court, Bldg., 77 William St.
BOUTON MOTOR CO., garage and salerooms, 111 West 42nd St.
BRADLEY JOHNSON AUTOMOBILE CO., 120 East 84th St. 'Phone 2830 79th.
BROADWAY AUTO EXCHANGE, 853 Seventh Ave. Second-hand Automobiles only. 'Phone 6363-6364 38th St.
CADILLAC COMPANY OF NEW YORK, 151 West 38th St.
CENTRAL AUTO STATION, 228 West 40th St.
CENTRAL PARK AUTO STORAGE CO., 110th St. and Central Park West.
COLE & WOOD, Automobile Aluminum Bodies, 48-50 West 63d St. 'Phone 715 Columbus.
CHELSEA AUTO STORAGE CO., 516-520 West 37th St. 'Phone 2434 38th St.
CHELSEA SCHOOL OF AUTOMOBILE INSTRUCTION, 518 West 37th St. 'Phone 2434 38th St.
C. A. DUERR & CO., Inc., Broadway and 58th St. 'Phone 4130 Columbus.
CLEVELAND AGENCY, 110 West 42st.
COMMISSION AUTOMOBILE CO., 742 Seventh Ave. 'Phone 2331 Columbus.
D. J. MARTYN'S AUTO REPAIR STATION, 53 East 124th St. 'Phone 1404 W. Harlem.
DEWITT AUTOMOBILE CO., 250 West 80th St.
EAGLE RUBBER TIRE CO., 1695 Broadway and 286 Washington St.
EMPIRE AUTO CAR CO., 266-268 West 125th St. 'Phone 2889 Morningside.
F. B. SCHENCK & CO., N. Y., 121 W. 89th St.
F. A. BAKER & CO., Indian Motor Cycle Station, 20 Warren St. 'Phone 1426 Cortlandt.
GANTERT AND PAUL, 116 W. 116 St. Pierce Racine Car.
GUS. LIND & CO., 231-233 East 47th St. 'Phone 4827 38th.
HARLEM AUTOMOBILE CO., 159-163 West 124th St. 'Phone 3566-61 Morningside.
HARRISON, J. A., Automobiles, Tires repaired.
HARROLDS MOTOR CAR CO., Sole agent for Pierce Arrow cars, 1780 Broadway. 'Phone 4130 and 4131 Columbus.
HATCH & CO., 1655 Broadway. Compound Agency.
HEWITT MOTOR CO., 6-8-10 East Thirty-first St. Great Pilot Bldg. 'Phone
HUNT & THOMPSON, 1052 West 39th St. Vulcanizers.
IRVING AUTO STATION, 126 East 125th St. 'Phone 4681 Gramercy.
JACKSON AGENCY, 1658 Broadway.
KASNER, A. H., tires for autos, cycles, carriages, bicycles, 132 Chambers St. 'Phone 6447 Cortlandt.
KNICKERBOCKER AUTO CO., 1780 W. 64th St.
LENOX AUTO GARAGE, 116th St. and Lenox Ave.
LURIE'S AUTOMOBILE DEPOT, 287-289 Morris Ave., Bronx. 'Phone 1277 Melrose.
MADISON SQUARE GARAGE, L. H. Crafts, Prop., 231-233 East Thirty-third St. 'Phone 457 Madison.
MANHATTAN STORAGE CO., 234-240 West 44th St. 'Phone 3838 38th St. Supervises warerooms and office, 47-49 Cortlandt St. 8565 Cortlandt.
MANUFACTURERS' MOTOR CAR CO., 54 West 43d St.
MANHATTAN AUTOMOBILE SCHOOL, 315 West 56th St.
MANHATTAN BRAZING WORKS, 112 Reade St.
MAJESTIC AUTOMOBILE CO., Broadway and 54th St. 'Phone 3840 Columbus.
MITCHELL MOTOR VEHICLE CO., 40th St. and Broadway. 'Phone 4677 Columbus.
MOTOR BUREAU, the National bureau for selling and buying second-hand cars, 1789 Broadway and 130 Nassau St.
MOTOR VEHICLE REPAIR & STORAGE CO., 121-123 West 31st St. 'Phone 1844 Madison. Edmond Sire, prop.
McNINTOSH AUTO GARAGE, 130 West 102d St. 'Phone 3658 Riverside.
MOUNT MORRIS AUTO GARAGE, 27-29 West 124th St. 'Phone 810 Harlem.
NATIONAL AUTOMOBILE CO., Room 4, 102 West 42d St.
NEW YORK BRAZING COMPANY, 309 West 125th St. 'Phone 838 Chelsea.
NEW AMSTERDAM MOTOR TRANSPORTATION CO., 158 West 56th St. 'Phone 4066 Columbus.
NEW YORK SCHOOL OF AUTO ENGINEERS, 146 West 56th St.
NEW YORK TRANSPORTATION CO., 49th St. and 8th Ave.; Garage, 250-270 East 66th St.; Branch, West Broadway and 130 Grey St. 'Phone 4160 Columbus.
I. M. PIGNOLET, 28 Cortlandt St.
PIERCE ARROW AGENCY, 1789 Broadway.
PNEU CURE CO.: Geo. W. White, mgr., 1113 Broadway.
PREMIER TIRE CO., 303 West 58th St. Branch at 247 West 56th St. Tires Repaired and Vulcanized. 'Phone 2491-38.
QUEEN AGENCY, Rooms 1708 and 1418 St.
ROYAL TOURIST AGENCY, 1787 Broadway.
SIDNEY B. BOWMAN AUTOMOBILE CO., 50 and 52 West 43d St. 'Phone 409 38th St.
SIER BATH CO., Repair Shop, 125 West 49th St.
SHARPE, W. M., 118 W. Broadway. Tires repaired.
SMITH & MABLEY, Inc., Broadway and 50th St.
ST. NICHOLAS AUTO DEPOT, 52-59 West 66th St. 'Phone 4317-8 Columbus.
SPOONER, F. ED., Fotographer, 1534 Broadway.
STORAGE BATTERY SUPPLY CO., 239 East Twenty-seventh St. 'Phone 1063 Madison.
THE SUNLIGHT GAS MACHINE CO., 49 Warren St. 'Phone 6295 Cortlandt.
TYRELL & MENAIR, Bronx Garage, 2862-64, Webster Ave. 'Phone 864 Tremont.
THEO. E. SCHULZ: Garage, Broadway and 110th St. 'Phone 2686-J Riverside.
THE WINDSOR AUTOMOBILE CO., 115 West 39th St. (formerly 521 Fifth Ave.). 'Phones 6293 and 6295 38th St.
THE AUTO SUPPLY CO., Broadway and 52d St. 'Phone 1813 Columbus.
TIMKEN ROLLER BEARING AXLE CO., 219 West 46th St. 'Phone 2043 38th St.
TREMONT GARAGE & REPAIR STATION, Bronx Agency for Buckmobile, H. Swedale, prop., 1042 Washington Ave., near Tremont. 'Phone 991 J. Tremont.
TUXEDO AUTOMOBILE STATION, 32-39 East 58th St. 'Phone 1121-26 Plaza.
UNION AUTO CO., TO RENT.—J. L. Magee, 1495 Broadway, Times Square. 'Phone 1724 38th.
TWENTY-FIFTH STREET GARAGE, 51st St. and Twelfth Ave.
TIMES SQUARE AUTOMOBILE CO., 164 West 46th St.
VICTOR AUTO STORAGE CO., 147-149 West 55th St.
WAYNE, KRATZER & CO., 1172 Fifth Ave. (near 98th St.). 'Phone 2961 J. 99th St.
WEST SIDE AUTOMOBILE TRANSPORTATION SCHOOL, 141 West 58th St.
WEST END AUTOMOBILE PALACE, 202-212 West 89th St.
W. J. DUANE & CO., 1771 Broadway.

Albany, N. Y.

AUTO STORAGE AND TRADING CO., 97 Central Ave.

Atlantic City, N. J.

CURRIE AUTOMOBILE CO., 12 and 14 South North Carolina Ave.
HALL & HASLETT & CO., 24 Mansion Ave.

Aurara, Ill.

FRANK ANDERSON, 113 Main St.

Auburn, N. Y.

CHARLES A. EILAS.

Bay City, Mich.

F. H. FENNER.

Bathleham, Pa.

NOVELTY AUTOMOBILE WORKS, 118 S. Main St.

Binghamton, N. Y.

STERLING MOTOR CAR CO.

Boston, Mass.

AUTOMOBILE SCHOOL OF NEW ENGLAND, 36 Columbus Ave. 'Phone 2804-J Oxford.
NATIONAL AND IMPERIAL MOTOR CARS, 41 Columbus Ave.

Branford, Conn.

JOHN C. BARNES.

Brooklyn, N. Y.

ACME MOTOR CAR CO., 6, 7 and 9 Ocean Parkway (near Park Circle). 'Phone 1454 Flatbush.
AUTO CAR CO., 701 Quincy St. 'Phone 38 Bushwick.
A. G. SOUTHWORTH, 322 Flatbush Ave. and 10 Clinton St.
BAKER AUTOMOBILE GARAGE, W. Barber, mgr., 58 Schermerhorn St. 'Phone 2484 Main.
BEACH GARAGE, Ocean Parkway, cor Sherman St. 'Phone 8087 Bader's Hotel.
BOSTON AGENCY FOR PIERCE ARROW AND OLDSMOBILE, 1740 Broadway. 'Phone 6840 Prospect.
BROOKLYN AGENCY KNOX AUTOMOBILE, Arthur R. Townsend, 1148 Bedford Ave. 'Phone 2492 Bedford.
BROOKLYN AUTOMOBILE CO., 12, 14, 16, 18, 20 New York Ave., near Fulton St. 'Phone 189, 192 and 195 Herkimer St. 'Phone 2300 and 2301 Bedford.
CAMPBELL GARAGE, Chas. Kickliff, mgr., 446 Hudson Ave. (near De Kalb). 'Phone 1369 Main.
COFFIN BROS. Cadillac, 1701 Quincy St.
CURTIS AUTO CO., 449 Madison St. 'Phone 3378 Bedford.
GAILLORD'S AUTO REPAIR STATION, 205 Havemeyer St. 'Phone 3834 Main.
GRANT SQUARE GARAGE, 1378-82 Bedford Ave. 'Phone 2141 and 1463 W. Prospect.
HYLTON CO., The Repair Station, 1128-36 Bedford Ave.
HICKS AUTOMOBILE CO., 1384 Bedford Ave. 'Phone 3414 Prospect.
H. B. SANDLER GARAGE, 623 Bergen St. 'Phone 113 Prospect.
INDIAN MOTOR CYCLE STATION, F. A. Baker & Co., 1086-89 Bedford Ave. 'Phone 1556 W. Bedford.
J. M. BEARS', 4, 6 and 8 Ocean Parkway, 7 and 9 Ocean Parkway (near Park Circle). 'Phone 1454 Flatbush.
LEWIS & CONGER, 1313-15-17-19 Hancock St. 'Phone 1500-J. Bedford.
MONROE GARAGE, 202 Monroe St. (near Bedford Ave.). 'Phone 1972-J. Bedford.
OUTERBRIDGE AUTO CO., Flatbush and Ocean Ave. 'Phone 1012 Flatbush.
ORMOND MOTOR CAR CO., Jefferson Ave. and Ormond Place. 'Phone 2142 Prospect.
PASTIES AUTOMOBILE GARAGE, 359 Sixth Ave., cor. 13th St.; also Ocean Parkway and Sherman St.
PROSPECT PARK AUTOMOBILE CO., 918-920 Union St. 'Phone 1500 Prospect.
PROSPECT PARK STORAGE CO., C. L. King, Prospect Park West and Union St. 'Phone 960 Prospect.
RKO & LOZIER MOTOR CAR AGENCIES, Hicks and Schermerhorn Sts. 'Phone 2404 Prospect.
SCHAAF GARAGE, Fulton and Cumberland Sts. 'Phone 3327-J. Prospect.
THE I. S. REMSEN MFGI CO.; Garage, 754-760 Bedford Ave. 'Phone 2826 Williamsburg. Offices, 740-750 Grand St.
WILLIAMSBURG AUTOMOBILE & STORAGE CO., 159 Clymer St. 'Phone connections.

Buffalo, N. Y.

BUFFALO MOTOR CAR CO., 437 Pearl St., Buffalo, N. Y.
NORTHERN GARAGE, 77 Virginia Pl.

Canton, Ohio.

T. S. CULP.

Charleston, S. C.

ARMY CYCLE MFG. CO., 82 Broad St.

Chicago, Ill.

ASHLAND GARAGE.
FRANK F. ELLSLEY, 1309 Michigan Ave.
IRVINE PARK GARAGE, 122d Lake Ave.
COMMISSION AUTOMOBILE CO., 1600 Michigan Ave., corner 16th St. 'Phone 1251 South.
AUTOMOBILE SCHOOLS OF AMERICA, 1602 Michigan Ave., corner 16th St. 'Phone 1371 South.
FADER-DELMAN CO., 1218 Michigan Ave. 'Phone South 557.

Charlotte, N. C.

OSMOND I. BARRINGER CO., Motor Car Dealers, 20-22 W. Trade, Charlotte, N. C.

Clarke, Ohio

W. E. BROUSE, Browning Bldg.
CENTRAL AUTO COMPANY, 38 Vincent St.

Columbus, O.

THE OSCAR LEAR AUTOMOBILE CO., 4th and Gay Sts.

Cuba

HAVANA GARAGE CO., Zulueta 48, Habana.

Denver, Colo.

COLORADO MOTOR CARRIAGE CO., 1432-38 Court Place.
DENVER AUTO CO., 23 West St.

Easton, Pa.

EASTON AUTOMOBILE CO., 41 Delaware St.

East Orange, N. J.

WIIITE SEWING MACHINE CO., Auto Department.

Elizabeth, N. J.

ELIZABETH AUTOMOBILE CO., 14 Westfield Ave.

Garden City, N. Y.

AUGUST POHNE.

Greanwich, Conn.

GREENWICH AUTOMOBILE BLUE BOOK STATION, Greenwich Ave.

Hartford, Conn.

THE PALACE AUTOMOBILE STATION CO., 122 Trumbull St. 'Phone 1-3-2-3.

Highlanda, N. J.

KINSEY & DOBBINS, Highlands, Navesink, N. J. 'Phone East View 2-J.

Hoboken, N. J.

V. F. MEYER, 120 Washington St.
R. FULCHER AUTO EXCHANGE, 14 Park St. John Nelson, Prop.

Huntsville, Ala.

THE SPRING CITY AUTO SUPPLY CO.

Indianapolis, Ind.

FISHER AUTO CO., 230 N. Illinois St.

Ithaca, N. Y.

F. A. McCLUNE, 205 S. Cayuga St.

Jersey City, N. J.

CRESCENT AUTOMOBILE CO., G. E. Blakeslee, Mgr., 2364 Boulevard. 'Phone 132-L. Bergen, Jersey City.
D. W. ROMAINE, Cadillac and Greve Sts. (off City Hall). 'Phone 4121 Jersey City.
HUDSON COUNTY GARAGE CO., J. H. Livingston, Mgr., 2593 Boulevard. 'Phone 252-L. Bergen, Jersey City.

Joliet, Ill.

JOLIET AUTOMOBILE & GARAGE, 100 Cass St.

Lawrence, Mass.

T. S. MORSE, Houstonic St.

Lincoln, Neb.

THE WITTMANN COMPANY, 209-215 South 11th St.

Lockport, N. Y.

DUSSAULT AUTO WORKS, 63 Buffalo St.

Los Angeles, Cal.

AUTO MACHINE & GARAGE CO., 651 San Pedro St.
C. C. STEWART, 632 Lucas Ave.
W. R. COWAN, 840 S. Main Cor. Broadway.

Marion, Mesa.

B. D. TRIPP.

Mobile, Ala.

A. L. GOULD.

Morristown, N. J.

VICTOR S. WISS, 23 South St.

Mount Vernon, N. Y.

MOUNT VERNON AUTOMOBILE CO., Prospect and North Third Aves.
MOUNT VERNON AUTO STATION, Prospect and Fourth Aves. 'Phone Mount Vernon Annex. 'Phone 149-R, Mount Vernon.

Montclair, N. J.

MONTCLAIR AUTO STATION, C. V. V. Gunther, corner Bloomfield Ave. and Valley Road, Montclair, N. J.

Newark, N. J.

AUTO TIRE REPAIR CO., B. Roenbock, manager, 32 Court St. 'Phone 3139 Newark.
BURT & CO., 285 Halsey St. 'Phone 2130 Newark.
BREEZE AUTOMOBILE CARRIERS, Breeze Motor Mfg. Co., 31 Court St. 'Phone 3072-R, Newark.
DECAUVILLE AGENCY, 286 Halsey St. 'Phone 3139 Newark.
ESSEX AUTOMOBILE CO., 9, 11, 13 Lombardy St. 'Phone 4490 Newark.
KINSEY & DOBBINS, 129 Riverside Ave. 'Phone 2291-R. Newark.
MOTOR CAR CO. OF NEW JERSEY, 291-293 Halsey St. 'Phone 1152 Newark.
P. H. JOHNSTON COMPANY'S GARAGE, 267 Halsey St. 'Phone 6672 Newark.
P. H. JOHNSTON COMPANY, Essex County agents for Cameron and Yale automobiles and Indian motor cycles, 267 Halsey St. 'Phone, 6672 Newark.

New Brunswick, N. J.

JOHN H. POTTER, 86 Albany St.
THOMAS LEE, Outlet Rock.

New Orleans, La.

ABBOTT CYCLE CO., 411 Baronne St.

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The "Maxwell"

Perfectly Simple Simply Perfect

The Evolution of the Maxwell Doctrine—Maxwell Cars

THE DOCTRINE:

1st. A cylinder of 5-inch bore with 5-inch stroke is ideal for a double-opposed gasoline motor.

2d. A double-opposed motor, 5x5 inches, when properly made, develops about 20 **ACTUAL** horsepower.

3d. To use four cylinders for motors of 20 or less horsepower is unnecessary, because thereby the number of wearing parts is unnecessarily increased.

4th. Twenty **ACTUAL** horsepower, not momentum or flywheel horsepower, is enough for every requirement except excessive speed or extreme fashion. Therefore a two-cylinder, 5x5-inch, double-opposed motor is the best, and **IT IS AS EVENLY BALANCED AS FOUR-CYLINDER CONSTRUCTION,** is very much less complicated, and much more reliable. It would take four 4x4-inch cylinders to develop the same power as two 5x5-inch cylinders, properly made.

5th. Four-cylinder cars appeal largely to "Fad and Fancy" only; **TWO-CYLINDER CARS PRODUCE RELIABLE SERVICE.**

The unprecedented successful record of the Maxwell cars during the season of 1905 proves the WISDOM of the above written DOCTRINE.

Reasons for the SUCCESS of the MAXWELL:

COMMON SENSE was the motive of its construction, not the impulse of "fad and fancy."

A 5x5-inch horizontal, double-opposed motor for a touring car, and a 4x4-inch for a tourabout have been proved the *ideal* types for *service and reliability.*

MAXWELL HORSEPOWER is demonstrated by the **ACTUAL CONTINUAL TEST,** not by the flash system of testing, which includes that resulting from the inertia of the flywheel. Therefore, **MAXWELL HORSEPOWER** is **ACTUAL HORSEPOWER.**

MAXWELL CARS ARE SPLENDIDLY MADE AS WELL AS PERFECTLY DESIGNED.

MAXWELL FEATURES in the PERFECT MAXWELL CAR:

MULTIPLE DISC CLUTCH, encased and running in oil, self-adjusting.

BEVEL GEAR DRIVE, combined with double universal joint, avoiding filthy, stretching chains.

THREE-POINT SUSPENSION, resulting in the adaptability of the car to the unevenness of the road without straining the mechanism.

NATURAL CIRCULATION OF WATER, automatic in action, and eliminating all pump troubles.

METAL BODIES, eliminating the opening up of seams and the checking of bodies.

GREATEST SIMPLICITY, RELIABILITY AND ECONOMY, resulting in the lowest cost of up-keep, maintenance and operation.

Write for catalogue, addressing Dept. 6.



Model H. 16-20-H.P. Touring Car Price $1,400.

It doesn't take a mechanic to adjust, to maintain and to run a **MAXWELL** car. **MAXWELL CARS** are sold under the *positive* guarantee that **AS GOOD A CAR** cannot be sold at a lower price.



Model L. 10-H.P. Tourabout Price $780.

MAXWELL-BRISCOE MOTOR COMPANY

CHICAGO Main Office: TARRYTOWN, N. Y. **NEW YORK**

Members American Motor Car Manufacturers' Association

BRANCHES:

MAXWELL-BRISCOE CO., INC. New York, N. Y.
MAXWELL-BRISCOE, MCLEOD CO., Detroit, Mich.
MORRISON-TYLER MOTOR CO., Boston, Mass.
FISHER AUTOMOBILE CO., Indianapolis, Ind.
MAXWELL-BRISCOE CHASE CO., Chicago, Ill.
RICHARD IRVIN & CO., Foreign Representatives.

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THE INCOMPARABLE

WHITE

THE CAR FOR SERVICE



WHITE RELIABILITY AND LOW GASOLINE CONSUMPTION AGAIN DEMONSTRATED.

THE silent, swift and sturdy White steam car starts on its sixth year of successful service with a sweeping victory in an important competition. The Los Angeles-San Diego endurance contest, held January 25th-26th, was won by a White steamer, carrying five passengers and 150 pounds of baggage. The winning White, driven by Charles A. Hawkins, made a perfect score—1,000 points. One other car, of 40 per cent. greater cost than the White, also made a perfect score, but as Mr. Hawkins had used but *seventeen gallons* of gasoline, as compared with *twenty gallons* used by his adversary, Mr. Hawkins's White was declared the winner, in accordance with the rules of the contest. Three other White's, driven by private owners, participated and received first class certificates, losing but one, two and three points, respectively.

The results of the above competition, except for differences in dates and places, read much like the summaries of every other reliability trial which has been held, starting with the New York-Rochester run of 1901.

Write for literature.

WHITE SEWING MACHINE COMPANY, CLEVELAND OHIO

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CORBIN



CORBIN CARS for 1906 are made in two models ONLY, a five-passenger light touring car, Model E, of 24 H.P., 100-inch wheel base, weighing 1,800 pounds, $2,000; and a superb two-passenger car Model G, of 24 H.P., 93-inch wheel base, weighing 1,600 pounds, $1,800.

THEIR SALIENT FEATURES ARE:

The Corbin System of Air Cooling---a Vindication of the Air-Cooled Idea.
The Corbin System of Mechanical Valve Operation---All Operating from One Camshaft.
The Corbin Steel Pan Motor and Transmission Support.

New floating bevel gear axle, new I-beam front axle single piece forging, new control, new universal joints, new oiling system, and

ANNULAR BALL BEARINGS THROUGHOUT

These and many other commendable features are combined in

The Corbin Idea for Simplicity, Accessibility, Durability and Safety.

THE

Corbin Motor Vehicle Corporation

MAKERS OF CORBIN AIR-COOLED CARS

NEW BRITAIN, CONN.

1404 Michigan Avenue, Chicago
5905 Centre Avenue, Pittsburg
470 Broad St., Newark, N. J.
Court and Exchange Sts., Rochester, N. Y.
4 West 38th Street, New York
Motor Mart, Park Square, Boston
206 North Broad Street, Philadelphia
115 East 7th Street, Cincinnati

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Profit is Gained

By Purchasers of the "American" because it's a car made by men and sold by men who well know what constitutes A Good Car.

First glance and the eye is pleased as to the design and finish, but the profitable point lies in the "makeup."

First of all the material used is absolutely the best money can buy and the workmanship the best brains can produce – hence good material and expert mechanical ability has made this car one of profit to buy, and one of pleasure to own.

Our catalog gives full details—you should write for it, and study the sterling features presented before buying.

Price - - - $3000.00

Including One Year's Guarantee.

35-40 H.P. Range of speed from 120 to 1450 revolutions per minute. Seating capacity 5 persons, semi-divided front seat. Wheel base 112 ins. Semi-elliptic oil tempered springs, 42 ins. front and 48 ins. rear, 1¾ wide. Upholstering—finest quality long grained hand buffed enamel leather, No. 1 long curled hair and oil tempered spiral steel springs in seats and back, deep full cushions, luxurious and very comfortable. Equipped with 4-in. Imported Continental Detachable Tires.



ASK FOR THE ACTUAL BRAKE TEST CERTIFICATE—AND GET WHAT YOU PAY TO GET

AMERICAN MOTOR CAR CO.

Indianapolis, Ind.

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The Queen



4-CYLINDER, 26-28 HORSE POWER, $2,000

Large Roomy Tonneau

FINISH UNSURPASSED

MOTOR—4-Cylinder, 26-28 H.P.
DRIVE—Shaft, Bevel Gear
FRAME—Pressed Steel
WHEELS—32 x 4
WHEEL BASE—101 inches
TRANSMISSION—Sliding Gear
FRONT AXLE—Solid Forged
GROUND PARTS—All Cylinders, Pistons, Piston Rings, Crank Shaft Valves, Universal Couplings and Transmission Shafts
EQUIPMENT—Five Lamps, Horn, Tools, Storage Batteries, and Irons for Top.

Finished in Various Colors—Upholstery to Match

WE CAN MAKE PROMPT DELIVERIES

C. H. Blomstrom Motor Company

DETROIT, MICH.

New York Agents: MAJESTIC AUTO CO. Cor. 54th St. & Broadway
Chicago Agents: BRANSTETTER MOTOR CO. 1337 Michigan Ave.
Boston Agents: BAY STATE AUTO CO. Boylston St.
San Francisco Agents: RARIG AUTO & GARAGE CO.
Los Angeles Agents: CENTRAL GARAGE

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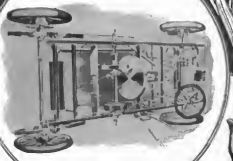
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LAMBERT

The Friction-Drive Car

SIMPLE
DURABLE
ECONOMICAL
GUARANTEED ONE YEAR

WRITE FOR PARTICULARS

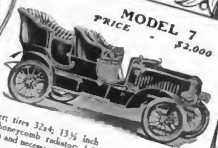


MODEL 4
PRICE - $1,050



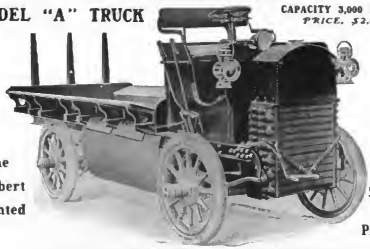
6 H.P. opposed motor, 30x3½ inch tires, high grade touring car at the price of an ordinary vehicle.

MODEL 7
PRICE - $2,000



34 H.P. 4-cylinder; tires 32x4; 13½ inch road clearance; honeycomb radiator; full equipment of lamps and necessary tools.

MODEL "A" TRUCK
CAPACITY 3,000 POUNDS
PRICE, $2,000



The Lambert Patented

Has Solved the Problem

FRICTION DRIVE TRANSMISSION

Our Model "A" Truck is a WONDER

This illustration is of one of them taking a grade with ease.

Note the 35 Per Cent. Grade

It was loaded with a cast-iron engine bed weighing several hundred pounds more than the capacity of the truck.

INVESTIGATE NOW

Lambert Touring Cars, Runabouts and Commercial Trucks . . . .

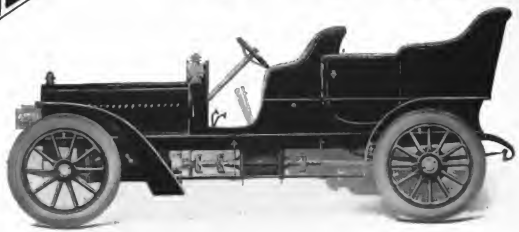
THE BUCKEYE MANUFACTURING COMPANY
Anderson, Indiana

Members of the American Motor Car Manufacturers' Association, Chicago, Ill.

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HARRISON

THE SENSATION



of the Chicago Automobile Show was the

Harrison Self-Starting Device

¶ Every other exhibitor of Automobiles visited our exhibit and looked over the **HARRISON CAR** to see how it was that we started our engine without the use of a crank. Almost invariably after they had looked over the **Device** they said, "Well, that is certainly very simple. It is a wonder that somebody has not thought of it before."

¶ Many manufacturers expressed themselves as being much pleased with our **Self-Starting Device,** and congratulated us on being the first to perfect a reliable piece of mechanism for the purpose.

¶ The world to-day knows that it is next to impossible for a lady to crank an automobile. Many ladies can operate a machine after the engine is once in motion, but when it comes to cranking, there is not one lady in one thousand that would take the risk of starting an engine with a crank.

¶ With the **Harrison Device** it is not necessary to get out of the seat in order to start the engine. All that is necessary is to pull a little knob and the engine starts instantly.

¶ Our catalogue, giving a detailed description of the **Harrison Car** and also the **Starting Device,** will be sent to any address upon request.

¶ There are several territories still open and we shall be pleased to hear from high-class agents.

THE HARRISON MOTOR CAR CO.

GRAND RAPIDS, MICH.

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WELCH

THE CAR THAT PROVES

Any maker can ***claim*** high rating for his engine, but we do more, we ***prove.***

By actual **dynamo** test, not **brake** test, the Welch engine demonstrates 50 H. P., hour after hour, continuous running, with ample reserve power for emergencies.

The flexibility of the motor enables the owner of a Welch to run at any speed desired from four to sixty miles an hour on the direct drive.

A universal favorite on account of its simplicity and the readiness with which parts may be replaced when necessary.

As only the finest imported steel and careful expert workmanship is used in its construction, it offers greater value than any other high-class touring car affords.



WELCH-
Motor-Car-Co.
Detroit and
Pontiac Mich.

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BERKSHIRE

High-Class Touring Cars



Made and Tested in the Berkshire Hills

¶ Our 1906 models comprise the highest type of automobile construction. They are equipped with 20-24 and 30-35 H.P. vertical motors and have the

Famous Berkshire Sliding Shaft Transmission

which enables the driver to start his car without shock or jolt. Ask our sales manager to tell you more about it.

20-24 H.P. - $2500
30-35 H.P. - $3000

BOSTON SHOW—SPACE 77-B

A quick application may secure an agency in desirable territory

BERKSHIRE AUTOMOBILE COMPANY General Office and Factory PITTSFIELD, MASS

American Mercedes



THE AMERICAN MERCEDES FOR 1906

THE AMERICAN MERCEDES is the counterpart of the World's greatest automobile—The Mercedes. In power, speed and weight, in mechanism, strength and finish, the two cars are precisely alike. The one difference is in price. The Mercedes costs $7,500 in Paris. The American Mercedes costs $7,500 in New York.

SAVE THE DUTY

The American Mercedes is an exact authorized copy of the famous Mercedes which is made by our parent company, the Daimler Motoren Gesellschaft. We are now working from the shop drawings of the 1906 Mercedes and import cylinder, castings, forgings, shafting, ball bearings, etc., from abroad.

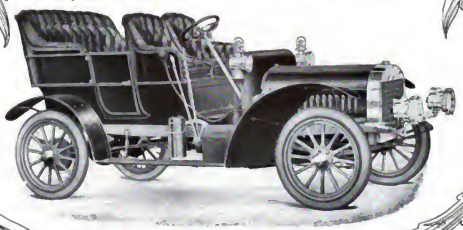
1906 Models now ready.

DAIMLER MANUFACTURING COMPANY - 967 Steinway Avenue, Long Island City, N.Y.
New York City Garage, 10 West 60th St.

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Rambler



Model 14, $1750.

Was generally conceded the financial proposition of both shows.

It is a medium weight touring car, strictly modern in design, equipment and appointments.

The logical result of years of study and development in the direction of simplicity in design and structural economy.

The power plant comprises a four cylinder vertical motor, with sliding gear transmission and shaft drive.

The accessories, such as carburetter, igniting, lubricating and cooling systems, are all the latest and most approved types.

Only the concentrated efforts of a large and perfectly equipped organization render possible the production of such a car at such a price.

Not only is the first cost attractive, but the structural simplicity assures the minimum expense of care and upkeep.

Your most critical inspection is invited and our catalog, giving full details, is at your service.

Main Office and Factory, - - - KENOSHA, WIS.
Branches: Chicago, Milwaukee, Boston, Philadelphia, San Francisco
New York Agency, - - - 134 West 38th Street

REPRESENTATIVES IN ALL LEADING CITIES

THOMAS B. JEFFERY & COMPANY

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"CHELSEA" AUTO CLOCK (TRADE MARK)

"CHELSEA"



$36.

C.C.C.

2¼-in. "SPECIAL" *removed* from OUTER CASE for use on MANTELS, etc., when Touring



"CHELSEA"

YOU want the BEST? Ask for the "CHELSEA" clock

"CHELSEA"

All our Pictures in reference to the 2¼-inch "SPECIAL" BEST on the WORLD. Has Locked Case, Shows Dial on an Angle, 8-Day Clock in the upper right hand corner shows clock with the inner clock removed from the Outer Locked case, making an attractive article for use on Mantels, Bureaus, &c., when touring. All 4 Clocks shown are 8 Day, High-grade. Cut 3 clocks in lower half of this advertisement represent in reduced size the regular 2¾-inch Auto Clock, 3½-inch Auto Clock and the 3½-inch Motor Clock. All are 8 Day, High Grade. Sizes stated are approximate diameter of the Dials. All are in Dupont Pat. applied for, Polished Brass Cases, most thoroughly weatherproof case on the market.

YOU want the BEST ? Ask for the **"CHELSEA"** clock

On Sale by Leading Dealers in Best Jewelry Auto and Yachting Supplies

MORGAN & ALLEN CO., 134 Sutter St., San Francisco, California, Selling Agents for the Pacific Coast.

CHELSEA CLOCK CO., 16 State St., Boston, U.S.A.

Largest makers in America of strictly High Grade

8-Day, Ship's Bell Clocks, Marine Clocks, Auto Clocks, Etc.

2¼-inch Auto Clock



$26.

3½-inch Auto Clock



$28.

3½-inch Motor Clock



$24.

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The WALTHAM-ORIENT AIR-COOLED CAR

is truly the master key to the problem of engine cooling in Motor Cars. It is the "Keystone of the Air Cooled Arch" and is "Waltham-Made." That means that Waltham-Orients are backed by a reputation of nearly fourteen years of good, strong, substantial construction, and our 1906 cars will strengthen that reputation to a marked degree.

Every car, Foreign or Domestic, has its admirers, but the particular mission of the Waltham-Orient is to fill the requirements of purse and possibility of the general public. It heads the list of cars ranging in price from $2500 down. *The Waltham-Orient does more than look its price,*—it goes where you will and comes back, safely and economically, Winter or Summer, over any kind of roads, and without the services of the professional chauffeur. A car embodying simplicity of construction, accessibility of parts, and ease of understanding.

FIVE TOURING MODELS FOR 1906

Model R,	20 H. P.	$2250.00.	Model N,	20 H. P.	$2000.00.
Model M,	16 H. P.	$1750.00.	Model L,	16 H. P.	$1750.00.
	Model K,	16 H. P. Runabout		$1600.00.	

ORIENT FRICTION DRIVE BUCKBOARD

THE LOWEST PRICE MOTOR CAR IN THE WORLD.

4 H. P. Air-Cooled. Weight 550 lbs. Runs 35 miles on one gallon gasoline and 1-3 pint oil. Maximum power 40 to 1. Innumerable speeds forward and reverse. Unparalleled for high climbing and sandy roads. Speed 25 miles an hour.

Active Agents wanted for unassigned territory.
Write for new 1906 catalogue and Agency proposition.



MODEL BB, $400.

WALTHAM MANUFACTURING COMPANY,

WALTHAM, MASS., U. S. A.

Members Association of Licensed Automobile Manufacturers.

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Wayne

This is the Wayne Model "F," a 50 H. P. 7 passenger car at $3,500.00 built solely for touring purposes. The enormous power of this engine is transmitted to the rear wheels with practically no loss. Hess-Bright ball bearings are used throughout, and the man who appreciates the need of reserve power is always sure to find it in Wayne Model "F."

We also make two other 4 Cylinder cars—Model "K," 35 H.P., $2,500; Model "R," 24-28 H.P., $2,000; also Model "C," 20 H.P., 2 Cylinder opposed Tonneau car, $1,250, and Model "H," 14 H. P., shaft drive Runabout with double opposed motor under the hood, $800.

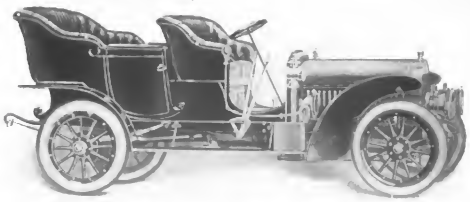
The Wayne Agent can supply a high-grade car at any price his customer may demand.

We Have the Best—car for the customer.
proposition for the Agent.

Write for Agency arrangements and descriptive matter.

WAYNE AUTOMOBILE CO.
DETROIT, MICH.





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A WINTON PARTY MOTORING ON HISTORIC GROUND

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VOL. V. No. 6. MARCH, 1906.





THE CHICAGO SHOW

PRAGMATIC! Heterodox! Business and Progress, were the sterling hall marks of the Great Western show, inaptly termed the Chicago Show simply because of its location, and which the local shows to follow on the Western circuit will be emphatic echoes and encores thereof.

Heretofore the West has simply been regarded as a great motor-car producing section, but the show revealed that hereafter "the whole boundless continent is ours," and that the far West has been conquered by the motor-car, and the supremacy of the East as a buying and using center is in danger. Chicago never was the center of the manufacturing motor-car industry of the West, but it is its position between the central cities, such as Buffalo, and the Western cities of Indianapolis, Cleveland, Detroit, and Lansing that makes it the center of the Western industry as a show place. Kansas City now furnishing the furthest Western maker who exhibited.

The Western industry now takes in the far West, the Southwest, the South, and the trade on the Pacific Slope, hence there was a wholesome breeziness, originality, and virile mechanical ingenuity displayed a tthe Chicago show that was truly American in all its aspects. The Chicago show was more than a national show and really international, a dozen foreign makes of cars from England, France, and Germany were exhibited there, showing that these glorious emigrants from the other side are no longer content to land in New York and stay there, but have now immigrated to the West to touch by the beauty of their mechanical conception and execution the hearts and the purses of the Western magnates of finance.

In Chicago all the warring and alliterative alphabetically named association of automobile makers were peacefully grouped together under one roof, side by side, thus representing the alpha and omega of the industry, because the show was under the direct auspices and sanction of the National Association of Automobile Manufacturers. Differing from the New York show, all of a maker's product was in one space, gasoline, steam, electric, pleasure and business vehicles, if he made all of these types.

The hebdomadal trade press of New York and Chicago have always differed as to the merits of the Chicago show. The funny fellows of the East have always contended that the Chicago show was simply an annual variety show, a partial reflex only of the New York show. The space writers of Chicago, in their exuberant verbosity, have declared the Chicago show to be the greatest in the world, but somewhere between these two widely diverging views, as in all such cases, lies the truth. Not one of the big national shows reveals all the new things. New York has its quota, Chicago more than its share, and the New England show held at Boston always brings forth some extreme local novelties and types.

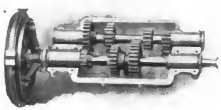
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Somehow or other all the world's big motor-car shows look alike. If one sat restfully in the little open gallery over the entrance to the Chicago Coliseum, called by courtesy the press room, and indulged in that restful day dream, which the Germans so sweetly call a "traumerie," and then opened his eyes suddenly and looked around, why the makers' names displayed would all seem familiar from those of the pioneers and pillars of the industry to those of the new comers and present producers of the day who made their first bid for favor there.

Every argument favors the holding of earlier shows, if any. The makers and dealers declare that they come to the present-day shows with all of their outputs practically sold. If the shows were held earlier the output would have to be ready earlier, the season would open earlier, and the business would become more of an all-the-year-around one. At present the shows are a great burden in a lump to the makers in the advertising line who has only a fixed annual advertising appropriation to spend, merely serving to keep the name of the



ADAMS-FARWELL MOTOR.



AUTOCAR TRANSMISSION.



INDESTRUCTIBLE STEEL WHEEL.

According to the veracious press agent's reports the attendance and sales were beyond all computation, which, as the Italians say, attunes falsely, but it must be said that the attendance was really enormous and the sales large, and while not many costly sales were made to private individuals there was undoubtedly a larger attendance of sales agents from all parts of the country than ever gathered at any show heretofore.

car before the public and imbuing the dealers and the buyer with faith in the hope of an early delivery. All of which is, nevertheless, retarded by the time the maker and his big departmental chiefs wasted at the great shows.

Scarcely less significant, however, was the meeting of the directors and delegates of the American Automobile Association, who control the sporting end of the game. In political affairs it has long been the custom where the district covers



MARSH RIM AND TIRE—DIAMOND RUBBER CO.



ADAMS-FARWELL SPRING.

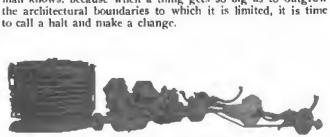
CRANK SHAFT, AMERICAN MERCEDES.



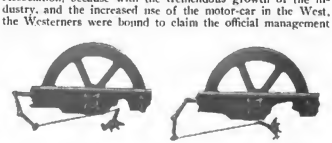
MARSH RIM AND TIRE-DIAMOND RUBBER CO.

As in New York, no one building was found big enough to house all the exhibits, so that it became necessary to add another structure to the space already secured and which was previously used and sufficed. Where this will eventually lead that portion of the industry that believes in indoor shows, no man knows, because when a thing gets so big as to outgrow the architectural boundaries to which it is limited, it is time to call a halt and make a change.

a large territory to allow one section to have official representation, and then by rotation to allow the other end of the district to nominate the candidates. That such a condition of affairs was pregnant was obvious to all who were closely watching the growth and affairs of the American Automobile Association, because with the tremendous growth of the industry, and the increased use of the motor-car in the West, the Westerners were bound to claim the official management



POWER PLANT, CHICAGO STEAMER.



CADILLAC STARTING CRANK.

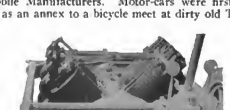
Significant indeed as touching on this aspect of the question was the resolution introduced during the show at the meeting of the American Motor-Car Manufacturers' Association, when it was voted unanimously to hold an outdoor show in either the month of September or October next.

of the association, for a while at least, and that is exactly what happened at Chicago. Banker John Farson, of Chicago, being the new president of the association, with Sidney S. Gorman, also of the Chicago Automobile Club, as its secretary; and rumor has it that experienced Henry L. Bowden,

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of Boston, will be the coming chairman of the racing board.

The Chicago show was really the sixth motor-car show held in Chicago, although only five of them, counting this year's, have been under the auspices of the National Association of Automobile Manufacturers. Motor-cars were first exhibited in 1898 as an annex to a bicycle meet at dirty old Tattersall's,



MARMON MOTOR.

and in 1899 the motor-cars were an annex to Van Sicklen's bicycle show. But sandwiched in between this function, and Manager Miles' first show was the sadly remembered Washington Park race track show, a rare combination of shows and races. Coming up to real shows brings us to the Coliseum affair of 1901, which gave New Yorkers the first touch of what a real blizzard is. Exhibits were few and, like the first

out the Chicago Automobile Club as a patron and participant in the profits, which history was recently repeated with the Automobile Club of America in New York, so that since then



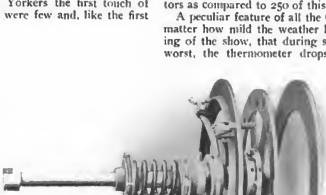
MARCUS KEROSENE MOTOR

the shows have been under their sole auspices, and ably conducted by Mr. S. A. Miles. In 1904 there were over 150 exhibitors. Last year's show was one of the greatest that Chicago has ever held, rivaling in the number of exhibitors even this year's show, because the 1905 show had over 275 exhibitors as compared to 250 of this year's show.

A peculiar feature of all the Chicago shows has been that no matter how mild the weather had been previous to the opening of the show, that during show week old Boreas does his worst, the thermometer drops down out of sight, and the



TWO CYCLE CALORIC MOTOR



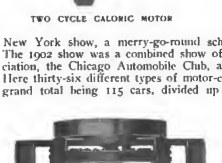
THREE SIDE THOMAS METALLIC CLUTCH.



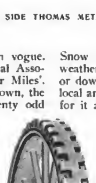
FORESIGHT VISIBLE SPARK PLUG. SHOWING AUXILIARY SPARKING GAP AND MAIN MULTI-POINT IGNITION GAP.

New York show, a merry-go-round scheme was in vogue. The 1902 show was a combined show of the National Association, the Chicago Automobile Club, and Manager Miles'. Here thirty-six different types of motor-cars were shown, the grand total being 115 cars, divided up among twenty odd

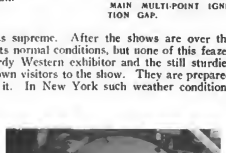
Snow King reigns supreme. After the shows are over the weather resumes its normal conditions, but none of this feazes or downs the sturdy Western exhibitor and the still sturdier local and out of town visitors to the show. They are prepared for it and expect it. In New York such weather conditions



GEARLESS TRANSMISSION ON DIRECT DRIVE.



ELEPHANT TREAD TIRE.



LAMBERT TRANSMISSION.

makers of gasoline carriages, seven makers of electric carriages, and seven makers of steam cars, seven, evidently, like the child in Wordsworth's poem being a popular figure.

Here at this show the nucleus of the American Automobile Association was formed, eight clubs being represented. The 1903 show was also held under the same auspices as the two previous ones, over 92 models of gasoline, electric, and steam cars being displayed. In 1904 the National Association cut

would, in theatrical parlance, "frost" the show's big attendance.

Chicago's show building, the Coliseum, fronts on Wabash Avenue, near Sixteenth Street, its main stone front and turretted towers giving it a majestic aspect. Unlike New York show buildings, whose size and depth is hidden behind a narrow front, the Coliseum is nearly square and all front, with a huge main floor bigger than that of Madison Square Garden, and one high gallery all around it, with a three-story annex

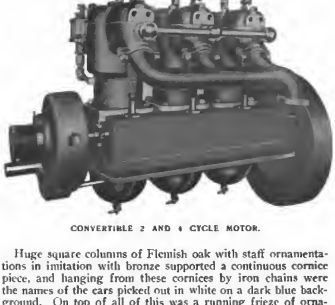
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adjoining it on the south, large openings in the brick walls connecting it with the main building.

The Coliseum has no long, handsome, decorative lobby, such as Madison Square Garden has, the entrance being painfully ugly, cheap, short and square, so that one plunges immediately into the main hall, getting a broadside view of the building full face rather than that of a long, perspective one straight ahead. The First Regiment armory, which was annexed this year, is only a few hundred feet away from the Coliseum, and fronts on Michigan Avenue. Connecting the two buildings a narrow runway was built, over 250 feet long, unbroken, save in one place, to permit of transverse travel.

Following the lead of the New York show, decorations were, of course, in order, but these decorations were the despair of the photographer, and as a result no good views were obtained of the show. The color-scheme was of yellow and black, yellow largely predominating, interspersed with white, purple, and green. The spaces were marked off by bronzed iron rails and these were draped with curtains in dark red. The floors were carpeted in dark green edged by borders of red.

As a background the walls of the main floor of the Coliseum were covered with weathered oak of a greenish hue and burlap. Along the balcony fronts was an ornamental cornice of staff with panels of weathered oak and interspersed in gold letters were the names of the exhibitors. From this down to the floor was deep yellow drapery in voluminous folds. The main floor was divided into three sections by colonnades, and these sections were interspersed with aisles crossing the building.



CONVERTIBLE 2 AND 4 CYCLE MOTOR.

Huge square columns of Flemish oak with staff ornamentations in imitation with bronze supported a continuous cornice piece, and hanging from these cornices by iron chains were the names of the cars picked out in white on a dark blue background. On top of all of this was a running frieze of ornamental staff, of conventional floral and intricate design. Flowers, rolling wheels with flying wings, the conventional figures the hammer and the gear wheel of mechanics being brought out in relief and gilded.

Previous shows at the Coliseum have been somewhat dwarfed by lack of light, but this show was a blaze of electric light. The main arches of the roof were outlined in incandescent lights and everywhere standards, bunches and groups of arc lights illuminated the aisles. Owing to the snowstorm which came early in the week the main entrances of the Coliseum had canopies over them, and along the Wabash Avenue front were hundreds of demonstrating cars, bearing the names of the makers, which were kept busy, notwithstanding the snowfall.

While there were some very radical departures from conventional practice at the show, none of these departures were strictly in the freak class, a freak mechanically having been defined by a sporting motorist as "a bird that has yet to win its spurs," or, better still, a freak might be classed in that definition as a rebellion or revolution which has not succeeded. At any rate the freak in motor-car construction may be left to its own fate in the struggle for survival.

A peculiar thing about motor-car shows is that notwithstanding all the notices, descriptions, illustrations, and touting of the new models that the public should be so eager to see them at the shows where an admission is charged; but this may be partly accounted for on the theory that these notices have awakened interest which can only be further maintained and concentrated by coming into personal contact with the new models somewhat on the principle of Helen's babies, who wanted "to see the wheels go round."

Nearly all motor-cars now look alike to the casual observer, due, of course, to the rapid advance towards fixity and uniformity of pattern, and which causes the rabid seeker for extreme and radical novelties to declare that we have reached the limit of original production. This is, however, due to the rapid strides that the industry has made during the first half of its present decade of its history, and has undoubtedly caused many motorists to lose one of their most charming senses, the sense of delighted surprise.

The most ingenious methods of our master mechanics which would have been really impossible only a few years ago are now received barely as a matter of course. The almost crude conditions of our mechanical product at the beginning of the present century are rarely recalled. In fact the vast majority of our owners and drivers know nothing about them, and what is more they do not care because the subject has been told over and over again, even to weariness, perhaps so, because not always well told; hence we shall not go over the course again here.

Summing up the New York and Chicago shows, the motor-car industry shows distinct signs of two irresistible tendencies. One is towards fixity of type, the other is towards reversion of type. Fixity of type means the mechanical condition although there may be several broadly different types of motor-cars in use, as there always are of other wheeled vehi-



HIBBARD POWER PUMP.

cles, all of one type are substantially alike, varying only in the minor details of construction.

The product of all the makers bears the same appearance apparently to the casual observer, no matter how much they may vary in real quality. Now when that time comes motor-cars will resemble cut nails, for instance, in being staple, standard, uniform, and alike. Such a time has not yet arrived, and it is needless to try and name the date now when it will arrive. Notwithstanding the signs of its approach are apparent. To offset this, however, one of the closest observers of the industry, a technical writer of note and ability, but always extreme and radical in his views, predicts that eventually nothing will remain of present day cylinder-fired motor-car construction excepting the cylinder and piston.

Getting back to the subject of reversion it may be said that reversion to type, which is a well-known phrase of the scientific evolutionist, means here only a return to early and once discarded forms of construction. Very few outside of those connected with the industry notice the process that constantly and gradually goes on, and the man who looks for novelties very often has the old thing presented to him and is thoroughly satisfied because he imagines he is looking at an up-to-date production, and it is really a common experience to find alleged new devices rapturously received by the *quid nunes* which the veteran readily recognizes as among the things he saw years ago in the refuse of the scrap heap.

Reversion to old mechanical forms comes out for several reasons. We must always remember that the motor-car, like the bicycle, the piano, the fiddle, and a lot of other things which could be here cited, really belongs to nobody, and was not, as a whole, invented by one man. Nobody invented the

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IN THE GARDEN OF THE GODS.

THE wonders of nature are shown to no better advantage anywhere than in the State of Colorado, and in no place in particular better than in that which is known as the Garden of the Gods. The Garden of the Gods is a natural park not far from Colorado Springs. Its fame has placed it in an enviable niche in the Hall of Fame of our nation's natural wonders. Its extraordinary geological formations, partially glacial and partially volcanic, astonish the visitor by their magnitude.

Fortunately those in power in laying out this great park of grandeur have in no way altered one tittle of the pristine beauty. The only handiwork of man that has entered into the adornment of the Garden of the Gods is the laying out of roads—and the ubiquitous motor-car, in its search for roads, has already made its entrance into this celestial land. The crumbled shale, pulverized in the process of time and weather to a whitish, impalpable dust, has formed the basis of an ideal road bed upon which the road builders have laid the surface.

The huge reefs in the geological strata are of many and wonderful shapes, known variously as the Kissing Camels, the Needles, Cathedral Spires, Balance Rock. There are places where there is a vegetation peculiar and indigenous to the soil. The evidences of volcanic action afford many sights interesting to the visitor and investigator.



W. J. BATCHELDER, OF DENVER, COL., AND PARTY IN A PEERLESS CAR IN THE GARDEN OF THE GODS. ONE OF THE ROCKS AT THE "GATEWAY" OF THE "GARDEN," SHOWING THE "CAMELS KISSING"—AT THE TOP OF THE PICTURE.

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SOCIETY FOLK WHO MOTOR

By Priscilla Speedwell

A MAN never buys a motor-car simply on the strength of what the salesman may have to say. Electric lights shone seductively on gay-colored cars at the shows in January. They shone likewise on the glossy shirt bosoms of the smooth tongued salesman in correct evening dress. And many society men made valuable purchases. But the salesman need not flatter himself that he did it all. In very few cases was this true. The society man is not so susceptible to smooth tongues, glossy shirt fronts, and nice shiny cars, in pretty colors. When he purchased a car, nine times out of ten he knew something as to its "manners." The man who is keen for the best thing in motor-cars keeps his eye on the behavior of his friends' cars. Take Stephen Peabody, for instance. He has just purchased two Packards. At Southampton he saw one of his fellow-cottagers use a Packard continuously and without a breakdown. So it is that every car must speak for itself. Mr. and Mrs. Peabody, at time of writing, do not expect to take a car with them for their trip abroad. But they are, above all else, amiable and American; not a bit like those toploftv creatures who find only the table-like roads of France sufficiently smooth for a tour. They look forward to using their cars next summer in this country.

* * *

MISS VIRGINIA CLAIRE HAYS, one of the richest girls in Pennsylvania, is said to have the finest car in Pittsburg. She uses it every day to make calls and for shopping-tours. Just now she is beginning to buy her trousseau. The lucky man who is to have all this superlativeness, both as to girl and to car, is Frank Chew Osborn, and after lavish use of such adjectives "richest" and "finest," apropos of Miss Hays, the typical Pittsburger adds, as an afterthought, "and she's a mighty fine girl in the bargain."

* * *

DOWN South in Mobile, Atlanta, and New Orleans, motor-cars are much in evidence during carnaval-time. Every queen of the carnival now rides in a car and there are many queens in the legitimate pack of fifty-two, to use card players' parlance. Miss Amanda Moore (Rittenhouse Moore's sister, bright daughter, who has written books and stories) is exceeding the speed limit in a new Columbia electric.

* * *

MISS GEORGINE WILDE who can manage her motor-car as well as she can her horses is an all-around athlete. She can sail a yacht and drive tandem with as much skill as Mrs. Thomas Hastings. She made her social debut at the Duchess of Sutherland's great ball in London, where her mother, Mrs. Henry Siegel, has a house. She is the favorite niece and namesake of Rear Admiral George F. Wilde

* * *

PAPAS gone to buy a skin
To wrap the baby huntin' in,"

is the old rhyme that runs through one's head when one sees some of the little Miss Mobiles, all cosy and cozy, in their big fur coats. There is Mrs. Benjamin Gumniess, for instance. She was the bright Bridget Bulkley, a famous English belle. She came here as a bride. Her motor coat (with a nobby little cap to match) is of sable. It hangs as full as though it were cut from cheap bow-wow fur, such as the boas the shop-girls with ten-pound pompadours wear. Only jealous folks say it's mink not sable. Every week, one sees the bright little Bridget starting



MISS GEORGINE WILDE IN A PACKARD.

out for a spin in her new Cadillac car. Golden-haired Grace Chapin has a coat of white coney with a collar of mink. The little creatures who are murdered for the benefit of the Mme. Mobiles, long ago ran away from the island that bears their name. Their fear of being made into frankfurter necklaces made them exiles, and now, alas! they are slaughtered to be made into motor-coats.

* * *

MR FRANCIS BISHOP, who is a brother of Mr. Heber R. Bishop, will take his bride, pretty Gertrude Pell, on a motor tour abroad. Both he and his brother, Mr. Heber Bishop, bought Packards a few weeks ago. Mr. Ogden Mills Bishop and Mr. Walton Oakley, will make a motor-car tour in France, going to Rome, where motoring as a sport has the sanction and encouragement of both the Pope and the Queen.

* * *

MR. AND MRS. H. VAN RENSSELAER KENNEDY and their dear little daughters, Marian and Maud, have sailed "Eastward Ho!" They will go directly to Rome, and then motor *en famille* to Paris, from sanctity to gayety, reversing Mr. Oakley's course. In the summer time they cruise on their yacht "Petrel"—papa and mamma, Marian and Maud.

MR. JAMES BROWN POTTER has an Oldsmobile, and with his pretty wife will doubtless motor in Virginia. Mrs. Potter was May Handy, the Richmond beauty. She had a step-sister, Miss Powell (her mother's daughter by another marriage) who likewise was pretty. She would have been called a beauty, too, so say the Virginians, if she had not been so badly "handycapped." As Mrs. Potter, in her Oldsmobile, the one time May Handy is likely again to outdistance all rivals.

* * *

MRS. SIDNEY DILLON RIPLEY, the sister of Mr. James H. Hyde, and Miss Annah Ripley, sailed for Europe on February 17 to make a motor-car trip abroad.

* * *

THE Hinkles and the Shinkles (these are bona-fide names, not made up for the sake of the rhyme) and all the well-knowns of Cincinnati delight in motoring. Mr. and Mrs. A. Howard Hinkle and Miss Marie Hinkle left for California early in February, their Winton being sent by rail. Mr. and Mrs. William B. Shattuck, who have their new motor-boat, "The Buckeye," down at Biscayne Bay in Florida, are also Cincinnatians.

* * *

MISS MARIE WINTHROP, the sister of H. Rogers Winthrop, of Equitable Life Insurance fame (but not defamed as he is reinstalled), can manage her own car very nicely. She was one of the first motorists among the girls identified with Lenox, and long ago dispensed with a chauffeur. On the



MRS. JOHN MARKLE, WIFE OF ONE OF THE PENNSYLVANIA COAL BARONS AND DAUGHTER OF MRS. J. HOOD WRIGHT STANDING BESIDE HER LEON BOLLEE CAR.

maternal side, she is a cousin of Mrs. Courtlandt Field Bishop, who makes long tours with her husband. Mr. Winthrop, whose accomplishment as an usher has given him the title of "Lord Harry of the Aisles," has long been an enthusiastic motorist.

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An Armored Motor-Car.

By Ad. Schmal

GENERAL METZINGER, Commander of the Army of the Alps, of France, made the assertion some time ago, on the occasion of a public interview, that the French motor-car industry would deserve well the country and the world at large, and, moreover, the strength of the French army would be enhanced, were armor-clad motor-cars, provided with rapid-fire guns, invented, perfected, and made practicable. The idea subsequently has been twice realized by the War Departments at Berlin and at Vienna.

The German experiments were conducted in the court-yard of the German Minister of War at Berlin. The motor-car designed with this military object in view, as far as can be learned, successful in everything, except that it was not able to do satisfactory traveling over ditches and cross-country and wherever there were no roads. The news of the tests percolated through the wall of secrecy which surrounds all the German military experiments, but aside from these nothing could be ascertained as to the particular form of construction,



THE AUSTRIAN GOVERNMENT EXPERIMENTAL ARMOR-CLAD MOTOR-CAR.



THE MEANS OF ENTRANCE AND EGRESS IS IN THE REAR AS SHOWN.

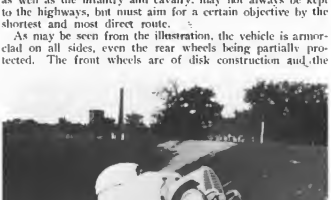
if it deviated in any degree from the conservative, used in the armor-clad vehicle.

While these experiments were kept secret in Germany, a similar series of trials of a motor-car designed to fulfill the same end as the German vehicle, has been going forward for the past few months in Austria under the utmost publicity, so that we have been able to obtain photographs showing the general form of the car. Specific mechanical details other than could be taken in by the mechanical observer at a glance were, of course, not obtainable.

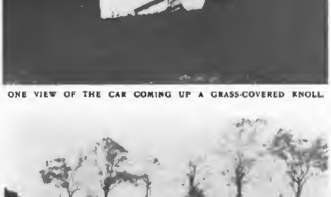
The chief mechanical difficulty in constructing a motor car practicable for carrying guns and the necessarily heavy protecting armor was considered well-nigh impossible. The average motor-car is designed to run along roads which have a certain definite degree of even surface, and cannot travel to every place that can be reached without difficulty by, nor run over surfaces comparatively easy to, a horse-drawn gun.

In the Austrian armor-clad motor-car this difficulty has been overcome by giving the vehicle two "motor axles"—that is to say, by making not only the rear wheels drivers, but also the front wheels, following the same principle as that employed in the Christie four-wheel-drive car familiar in this country. In fact by this distribution of the motor-power this armor-clad motor-car is capable of running across marshes, meadows, fields, ditches, and other uneven and almost tractionless surfaces, and down the steepest grades with as much safety as at least a team of horses. This ability renders it suitable for military operations, inasmuch as, in actual field manœuvres, the artillery arm of the army as well as the infantry and cavalry, may not always be kept to the highways, but must aim for a certain objective by the shortest and most direct route.

As may be seen from the illustration, the vehicle is armor-clad on all sides, even the rear wheels being partially protected. The front wheels are of disk construction and the rear wheels are of the artillery type. The driver's seat may be lowered so that not a person of the gun squad can be seen. The driver can see through two small apertures at the side of the vehicle as well as ahead.



ONE VIEW OF THE CAR COMING UP A GRASS-COVERED KNOLL.



ANOTHER VIEW OF THE CAR GOING UP A SHORT UNEQUAL SURFACED HILL

The back part of the structure is covered with a cupola-like structure in the centre of which is mounted a gun of the usual field type, which can be turned in every direction. The vehicle can thus advance against an enemy and the firing be done without any complicated manœuvering of the vehicle as regards position. The motor is of 40 motor-power, gasoline, but presents, as far as can be ascertained, no remarkable or original features.

When it is under way at about thirty miles an hour, with the seat lowered, we can well imagine that the impression this unusual appearing vehicle would give is likely to call to mind those infernal machines in which, according to the fancy of Wells, the English Verne, the inhabitants of Mars will reach us.

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U. S. ARMY

MOTOR-CAR AMBULANCE.

By WALDON FAWCETT.



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PLACING THE LITTERS IN THE MOTOR-CAR AMBULANCE OF THE U. S. ARMY.

THE War Department at Washington has been somewhat behind the corresponding branches of the leading European governments in demonstrating the practicability of the motor-car for military purposes, but progressive officers of the United States Army have persistently carried forward investigation and experiment in this field during the past few years, with the result that trials of motor vehicles have been made in connection with the work of various branches of the service, and American military officials have been responsible for the creation of two unique and distinctive types of motor-cars, both of which have been proven to have practical value.

The first of these Yankee contributions to the world's motor-cars was the motor telegraph car of the United States Signal Corps, which has given a good account of itself under campaign conditions, notably at the great army maneuvers on Bull Run battlefield. The latest addition is the recently completed motor-car ambulance, especially designed and constructed as an indispensable part of the hospital service of the United States Army.

The influences that resulted in the production of this motor ambulance were set to work more than a year ago, when Surgeon General O'Reilly called the attention of the Secretary of War to the fact that practically no advance had been made since the Civil War in the provision of facilities for the transportation of dead and wounded on the field of battle.

As a result of the representations made by the Surgeon General, Capt. Clyde S. Ford, Assistant Surgeon, United States Army, stationed at Fort Barrancas, Florida, was detailed to make a special study of the subject. Capt. Ford, after a thorough investigation, came to the conclusion that a motor vehicle ambulance system was not only well suited to the needs of the army medical department, but that the self-propelled vehicles offered the only solution of the problem in hand. The findings of the medical officer determined the War Department to give the proposed new system a practical trial, and the government arranged for the construction of a car designed in accordance with the suggestions of Capt. Ford and other experts.

The new army motor-car ambulance which has lately gone into service is a White steamer, constructed by the White Sewing Machine Company, of Cleveland, Ohio. It is of eighteen motor-power, and in so far as fundamental construction is concerned does not differ very materially from the standard White touring car. The body, however, is wholly different, having been designed by Capt. Ford.

The body has a high top from which hang heavy curtains bearing the letters U. S. and the regulation red cross which constitutes the emblem of the medical branch of our military service. This insignia also appears on the wooden body of the car. When the ambulance is in use as an ordinary conveyance by officers of the medical department or is to be utilized for the transportation of slightly wounded soldiers the interior of the car presents a clear space save for the long seats on either side, the occupants of which face one another. When, however, the car becomes a hospital on wheels, the interior undergoes a transformation.



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SHOWING THE INTERIOR OF THE AMBULANCE.

The side seats are folded snugly against the wall and two of the litters or stretchers, which have previously reposed on exterior brackets or racks at the sides of the car, are placed, with the occupants extended full length, side by side on the floor of the car. Two other stretchers, similarly occupied, are placed midway between floor and roof in positions somewhat corresponding to the upper berths of a sleeping car. The litters in this upper tier are each supported at the inner side on iron hooks set into poles or standards of oak let down from the ceiling (where they are stored when not in use) and form a sort of skeleton partition in the middle of the car. The opposite side of each stretcher is suspended by leather straps from the wall of the car. When the entire space in the car proper is thus given over to four wounded men, the ambulance surgeon rides on the broad step at the rear of the vehicle and the front seat is sufficiently roomy to accommodate two medical attendants in addition to the chauffeur.

The new motor-car ambulance represents a type of vehicle which can be supplied to the government at about $3,000 each, and which will probably be utilized in considerable numbers by the Medical Department. While they are designed primarily for service in time of war for the removal of the wounded from the field to field hospitals, they will also have an extensive usefulness in the transfer of invalids from the temporary hospitals to base hospitals or to railroad trains. The recent decision of the War Department that in future all American troops shall be hardened for service by frequent long practice marches further expands the immediate field of usefulness for these vehicles since such arduous service invariably sends a greater or less proportion of the enlisted men to the hospitals.

It has already undergone tests sufficient to demonstrate conclusively its value, and ability to meet all exactions likely to be placed upon it. In trials aggregating more than 1,600 miles made at Fort Myer, Va., and elsewhere in the vicinity of Washington, D. C., there were no break-downs and no disappointments or failures. In one test the ambulance carried a load of twelve persons a distance of fifteen miles over ordinary country roads in less than an hour. On a smooth road, on another occasion, it attained a speed of nearly forty miles per hour. In the demonstrations over the rolling country of northern Virginia, the new machine proved itself a most satisfactory hill-climber and evidenced an ability to travel over ploughed ground at a speed of six miles per hour. Inasmuch as the motor telegraph car of the Signal Corps is a gasoline car whereas the new motor ambulance is a steam machine, it is likely that the comparative showings of these two cars will influence the government's choice.



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THE HOSPITAL SQUAD IN CHARGE OF THE NEW U. S. ARMY MOTOR-CAR AMBULANCE.

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Touring in California.



By L. L. Whitman.

LONG tours require considerable thought in preparation, and we gave considerable to the tour before we commenced to prepare for it, and much preparation before starting. We finally decided to make it a touring and camping trip in our motor-car. To begin with, we live in Pasadena, California. A trip of this kind may be spoiled in the east by rain, but in California it never rains during six months of the year, so there is little danger of your camp or your ardor being drowned. You can roll up in your blanket at night, look at the stars, and never worry about what the weather is going to be on the morrow. California is a big state, eight hundred miles long by two hundred and fifty miles wide.



GLACIAL POINT

This story, taken from the motorist's standpoint, relates to the car and what we personally saw on the road and in camp. Our car was a Franklin, four-cylinder machine, air cooled, and of ten motor-power. Taking off the tonneau, I made a baggage box of ample dimensions to carry our "plunder," and bolted it on the rear deck. I will not say this held "all the comforts of home," but whenever we broke camp and packed up there seemed to be ten times as much as ever before. The principal things were a tent eight feet square, blankets and bedding, a collapsible table, and two folding camp chairs. These last could be extended to make a cot, but we found the mattress and ground preferable, after a few trials. We strapped the tent poles to the side of the car, and our extension cases of clothing on top of the hamper and camp chairs, a canvas being fastened over the whole to keep out the dust. The cooking department consisted of sundry pots and kettles, tin cups, plates, etc., and supplies were bought en route. At any time we could get fruit of the finest kind —oranges, lemons, peaches, figs, apricots, melons, grapes, berries, etc., through the producing districts we should pass. Staple articles always to have aboard were bread, bacon, tea, coffee, sugar, potatoes, and a few canned goods. To keep off the scorching sun of the deserts I purchased a big umbrella sunshade, attaching it to the seat so it could be quickly taken down and strapped with the tent poles when not wanted. On the hottest day a breeze was created under this, making it very comfortable. Then a camera, tripod, and fish pole were included, also an extra tire, two inner tubes, cement, and patches.



VERNAL FALLS IN THE YOSEMITE.

Our gasoline tank held fifteen gallons and was just the thing for touring. Two or three gallons of cylinder oil in tight screw top cans were taken along, and a few extra parts, valves, plugs, and tools. For the cool part of the day extra wraps were taken. All told, if you had seen all the "stuff" spread out on the ground you would have said it never came off one motor-car. An ax and a canteen for water were other extras. After a few days' preparation, we started on the tour. We left Los Angeles at 3 p. m. one day for the north. Our loaded motor-car attracted considerable attention, but our tent poles and baggage told our intentions.

Out of the city, we whirled through the beautiful hamlet of Hollywood with its fine private residences, over a range of hills, then through a fertile wheat country. Six p. m. found us sixty miles on our journey. There we overtook two motor-cars, occupied by Drs. Bird and Holmes, of Los Angeles, with their wives, off on a camping trip, like ourselves. This was indeed a surprise. After introducing ourself in true Western style, we all agreed to push on a few miles to a good camping site and camp together for the night.

We passed a pleasant evening by our camp fire and retired, leaving our newly found companions behind us in the morning, having in view a visit to a sugar factory at Oxnard. If all went well we were to again meet them and camp at Ventura River that night. Down the Conejo Grade we had an extended view of the valley as we wound down the tortuous mountain road. At Oxnard we took lunch at the hotel and immediately after visited the largest factory in America, where beet sugar is produced. The season's run was just commenced, not to full capacity, yet we saw three thousand seven hundred and eighty sacks of one hundred pounds each, or 198 tons, which was produced the day before.

We had spent so much time at the factory that we had to hurry on to reach our friends at Ventura River. Just at sunset we espied their tent among the trees at the ford. We quickly threw up our tent, built a fire, and soon had the coffee pot singing. After supper we sat round a big camp fire, told a few stories, a few lies, and "hit the pipe," excusing the ladies in the last. In the morning we had to ford the river, which, in the rainy season, would be impossible. The banks are rather steep, so we took a lively sprint, splashed through the water and just made the top of the opposite bank. From here we immediately began to climb the mountains, four and one-half miles over what is known as the Casitas Pass. By a very winding road, shaded much of the way by oak trees, we reached the summit. Here we stopped awhile and enjoyed the magnificent view. Down the mountain at Shepherd's Inn we stopped for lunch. A few miles farther, we came to the ocean and skirted the beach some twenty miles to Santa Barbara. On the way we passed Summerland where we saw the novel spectacle of oil wells in the ocean. Of some five hundred wells hereabout, half of them are on the beach and land, the remainder being sunk in the ocean along wharves that have been constructed. We presume our motor

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looked with satisfaction at the huge tanks of black oil, as gasoline is one of the products of this oil.

At Santa Barbara we stopped two days. A big hotel, the Patter, costing over a million dollars, is situated there, and in the winter is filled with guests from the frozen East. On Monday morning, bright and early, we left the city. Our route for thirty-five miles was along the coast—mountains on our right and the blue Pacific on our left. Deep canyons run from the mountains to the sea. At the bottom of these are streams, big sycamores, and fine camping spots. Occasionally our road came on high bluffs overlooking the ocean, the white surf boiling at their base. First fruit, then grain, then cattle ranches dwindling away, till at Gaviota Landing we turned to the right, leaving the ocean and climbing through the mountains. A few miles up we stopped for lunch in a narrow pass. In the midst of our repast, we were interrupted by one hundred head of cattle driven by two cowboys. Hastily picking up the edibles and putting them into the car, we took the rocks afoot, while the cattle crowded around the machine.

A few miles over the summit we passed Santa Inez mission, and a little later, after about fifteen miles' spin, we reached Los Olivas. An hour later we were in an odd-looking country of large, short-trunked oak trees. From a hill we overlooked miles of them. Soon after we ran across two motor-cars, and shortly after that another. The last stopped to inquire how far it was to a town, and from these people we learned that it was some twenty miles to Santa Maria, where we expected to stay for the night. It was about sunset and we had to hustle. The car seemed to steer a little badly; a look at the rear wheel was enough—another flat tire. Having no extra unpunctured tubes, I proposed camping where we were, avoiding a patching job after dark. In fact it was about time to light the lamps if we were to run any further. Just then a coyote barked and another one howled over on the hillside. That settled it; Mrs. Whitman said she knew they were mountain lions, and begged me not to camp among these howling brutes. I surmised that there would be little sleep in camp if we stayed, so, jumping in, we ran on slowly, hoping to hit a ranch house. We came across a camp of fourteen people from Pasadena homeward bound from a five weeks' trip to the Yosemite and put up our tent and camped with them.

In the morning I sat down to play with those inner tubes, while the Pasadena campers went off south. In an hour we were off, and in less than an hour that tire was off, too. I began to smell a rat, so making a diagnosis of the case (outer case) I found that a previous puncture was cutting those inner tubes about as fast as I could put them in. I applied heroic treatment, jerked off that cover, and put on the extra one and had no more trouble for a while. In the afternoon at San Louis Obispo I put in a half set of new batteries, the ones in the car having been in a long time and of doubtful quality.

At 4.30 p. m. we were climbing Cuesta Grade, a raise of about a thousand feet in some two miles. Meeting teams was bad here, there being a deep chasm on the right as we wound along the mountain side. We met two, but placing the car on the outside edge, as I always do in such cases, they passed on the inside nicely. I always stop my motor, and sometimes go back to a more suitable place if the team shows fright.

Over the summit we whirled through Santa Margarita, at sunset, hoping to make Pasa Robles before dark. Arriving at Pasa Robles we found Drs. Bird and Holmes again, not having seen them since we were at Ventura River. We immediately drove tent pins in circus order—so did the fleas before morning. Five miles in the morning brought us to San Miguel, and three miles more to a bad sandy river crossing. Earlier in the season a fifteen-mile detour would have to be made on account of the high water. Our season found only a dry sandy bed, two hundred yards wide. I walked over it and thought there would be one chance, so I took the chance. My wife got out and I tickled the carbureter, pulled up the spark, stuck in the low, and attended strictly to business. Well, we just made it in one jump. We reached Jolon that night and stopped a day at the hotel.

The hotel proprietor told us he had ox-teamed it across the plains in '49 to California; he had served under Kit Carson in Arizona Indian wars, and had a big collection of relics among which was a buckskin suit presented to him by the famous scout. When a boy, I used to like reading the life of Kit Carson. Here was one of his companions. He told us that these Indians lived mainly upon bread made of acorns, boiled to remove the tannin, then pounded and baked in huge cakes on the rocks. These cakes were fastened to the roofs inside their wigwams, and a clunk cut off was ready to eat today or six months hence. These Indians had no God, but believed in evil spirits; everything bad or incomprehensible was a work of the devil. It was lucky I had not come along a hundred years ago and made them a call with the Franklin.

Leaving on Friday morning, our first ten miles was a beautiful drive through scattered oaks, four to six feet thick, short trunks, and wide extended branches, some of them spreading one hundred feet. Here we descended one thousand feet into



TENT PITCHED IN THE HOLLOW OF A BIG REDWOOD TREE, IN BIG BASIN.



A TYPICAL SIGHT IN THE SANTA CRUZ MOUNTAINS OX TEAMS FOR HAULAGE.



YUCCA IN THE MOJAVE DESERT.

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Salinas Valley. For fifty miles we ran through a wheat country, and, at one place, we saw the bleached ground and stubble where eight thousand acres of standing wheat was swept by fire in one day.

From Soledad to Salinas we had a heavy head wind. This wind from the ocean setting inland is characteristic of the Pacific Coast in summer, the hot interior desert air, ascending as from a furnace, causes the colder undercurrent to set in from the ocean. Up valleys and passes in the mountains, it draws with added force. In the afternoon we reached Watsonville, in Santa Cruz County, and left the level wheat belt for the hilly country devoted to fruit and berry raising.

The next day we made Santa Cruz City in the forenoon. Filling the gasoline tank, and getting some cylinder oil, after lunch we headed for Boulder Creek and the mountains. A few miles out we were brought to some of the most beautiful scenery in the world. The road is a long way up the side of a high mountain. At one place we stopped the car and, looking below, saw two teams, one above the other, and still further down, men cutting timber. Above us lumbermen were cutting timber, which was slid down the mountain side along a track made of straight logs oiled with crude oil. The big logs flashed down this track like "greased lightning," sometimes jumping the track, and, flying high in the air, striking and cutting down trees a foot or more in diameter. We reached Boulder Creek hamlet at sunset, which has seven hundred inhabitants and seventeen saloons; Business—lumbering and beer.

Twelve miles back of Boulder is Big Basin, a tract of virgin redwood forest. California has purchased thirty-eight hundred acres of this land, at an expense of two hundred and fifty thousand dollars, to be preserved in its natural state. A rough road has been constructed to the Basin, where a park warden lives. We decided to run there in the car and camp a few days. The road was pretty steep in places, and near the summit we had to block the wheels a few times. The trees were a wonderful sight. They grow so close together in places that the sun does not penetrate at midday. Two, three, and even four hundred feet high, and eight to fifteen feet in diameter, and at the base near the ground much larger, are these forest giants. Many have deep wounds burned into the bases caused by forest fires hundreds of years ago. Some of these holes are very large, one large enough for us to pitch our tent in with plenty of room to spare. Ours was the first motor-car ever to reach this forest retreat. It was a Jules Verne journey to an enchanted land. We finally returned to Santa Cruz and thence set out for



A VIEW OF EL CAPITAN, YOSEMITE VALLEY, THROUGH THE TREES.



A NIGHT AT FISH CAMP, NEAR MARIPOSA GROVE OF BIG TREES.



A WINDING HILL IN SAN LUIS OBISPO COUNTY.

Oakland and San Francisco. After a few days in 'Frisco, we left for the Yosemite Valley, through San Joaquin Valley and Merced to Berenda. The next morning we headed for the Sierra Nevada Mountains, the foothills dimly seen low on the horizon. Arriving at Raymond about 10 a. m., we filled the gasoline tank, this being the last place gasoline could be bought. We also put aboard some additions to our provision department.

Here stages usually carry the tourist to Yosemite, seventy-five miles away in the heart of the Nevadas. Eighteen miles, and we reached Grub Gulch, where we waited from one till four p. m. to avoid meeting several stages on the bad roads above. The remainder of the afternoon we crawled along on low gear, the deep dust, steep grades, and very crooked road making anything else impossible. Months without rain had left three to six inches of dust.

We pitched our tent by the roadside, near a spring. Bacon, eggs, and coffee, and a camp fire of pine knots make the real camp. We were on the road at 6 a. m., and for fifteen miles we climbed, making the engine snort and growl in some of the dusty ruts. We reached Fish Camp at 8.30, and here we camped in a beautiful little valley five thousand feet above the sea. A cold tumbling stream ran down the center, and towering pines surrounded the whole. We stopped two days.

The Mariposa Grove of Big Trees was eight miles away by road, and we visited them. You have all read and seen pictures of these trees, so no lengthy description will be undertaken. They are a wonderful sight. There are two hundred and thirty-six trees left in this grove, scattered all over a few acres. The biggest, the "Grizzly Giant," is 285 feet tall, 31 feet in diameter, and ninety-three feet seven inches in circumference. Twenty-two people can join hands and reach around it. Six horsemen, at equal distance apart, can ride around this tree and not see one another. A large proportion of the trees are ten to fifteen feet in diameter, and a few twenty to twenty-five feet. Two have holes cut through their trunks so the stage drives through them. The years, "rings" of the trees show that some of them are five thousand to eight thousand years old. This variety of tree is found nowhere in the world except on the west slope of the Sierra Nevada Mountains, in California.

From the upper side of the grove we ran to Wawona Point, seven thousand one hundred and forty feet above the sea level, the highest point we reached on the trip. We lunched on the summit and enjoyed the extended view. Returning through the grove we ran on down to Wawona and camped there a week. From the upper side of the

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grove we ran to Wawona Point, 7,140 feet above the sea level, the highest point we reached on the trip. We lunched on the summit and enjoyed the extended view. Returning through the grove we ran on down to Wawona and camped there a week. This is another beautiful spot and valley in the mountains. The days passed quickly—all too quickly. We staged and trailed over to Glacial Point, looked down the 3,200 feet of straight drop. We walked down the "short" four-and-one-half mile trail to the floor of the valley. We visited the Falls, Mirror Lake, and took a trip around the valley. This valley is about ten miles long and two or three wide, enclosed by almost perpendicular walls three to five thousand feet high.

We finally came out to Wawona and made ready to leave for home. We reluctantly pulled down the tent, lashed up any loose bolts on the car, loaded on our baggage, and turned the starting crank. We came out of the mountains via Fresno Flats. That night we reached Fresno in the San Joaquin Valley.

For eight miles out of this city we ran along one of the most beautiful drives of the whole trip. Palms twenty feet high line the highway between these smaller plants and flowers. That day we crossed twenty or thirty miles of desert. It was so hot that one tire went flat, the heat melting the patches from the inner tube. You could not hold your hand to the tires on account of the heat they contained from spinning along the hot sand. We stopped that night at the Hotel Los Banos. Here we passed the home ranch of Miller & Lux. They own a "small" wheat farm of one hundred and fifty square miles—a full twenty-five miles long and six wide. It is fenced into mile squares.

Think of the thousands of horses, with their harness, the great quantity of farm implements, and the hundreds of men, that it takes to keep this ranch running! I think this is the largest wheat ranch in California. We crossed over to Gilroy and San Jose, from which latter place we took the west side of the bay to San Francisco. The road passes through Santa Clara, Palo Alto, Redwood City, and San Mateo, and finally reaches San Francisco, where our trip ended. The actual trip was over, but a thousand pleasant memories of experiences and things and people remain. Fifteen hundred miles of changing scenery such as only California can show had sped by, that no artist can paint, no writer describe, and, best of all from a motorist's view point, every day of our outing a cloudless sky, again such as only California can show. Every motorist who has a month to spare should pack up and hie himself to California for a tour such as he cannot experience elsewhere.

PROSPECTING IN A MOTOR-CAR.

By H. J. SHEAFE.

MOTORISTS in general, especially those of my profession, mining engineering, may be interested in a unique trip across the State of Nevada, over country where no roads or scarcely even civilization by of all pioneer travelers. After considerable investigation and inquiry I finally purchased a 30 motor-power Pope-Toledo and readily mastered the mysteries of "chauffeurship." The car was shipped by rail to Battle Mountain, Lander County, Nevada, from which place I started out on my trip across the State. The car, as the illustrations show, was of the regulation touring type, fitted with a cage top.

My course lay almost due south to Bullfrog, the new mining camp near the edge of Death Valley, where the hidden mine of the now famous "Scotty," the Croesus of the west, is supposed to be located. I had to make many side trips over the country—a decidedly primitive country as regards roads. Finally I returned to Tonopah via Goldfield and started for Salt Lake City by way of Belmont, Eureka, Cherry Creek, Ibapah, etc., thus traversing the whole of the State of Nevada and nearly all that of Utah, covering a total distance of approximately 1,100 miles.

In making this long tour the car had to cross fifteen mountain ranges, attaining a maximum elevation of 9,500 feet above the sea level, and climbing grades of twenty-five per cent. In comparison with the old means of transportation over this country—the patient little burro, a picture of which is shown herewith—contrasts greatly with that which I was following. The time occupied in transit was as nine to three, and, moreover, is considerably more comfort. The roads, when there were any, over which I had to travel, were scarcely deserving the name, and were rather merely trails which the various caravans have made.

Drawbacks and mishaps are inevitable where conditions are so extreme, and, in spite of all that I encountered, I emphatically consider the motor-car vastly superior to any other mode of conveyance in the country over which I traveled. I know whereof I speak, inasmuch as I have tried them all.

The few photographs shown herewith, taken along the way, serve in a measure to give an idea of this country. I expect to return west again, taking the car as far as Death Valley before the end of my trip, and I fully expect equal success to that which I have just experienced.

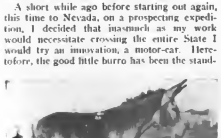
With one exception no record was kept of gasoline used. This exception is worthy of note inasmuch as I traveled 166 miles, crossing three mountain ranges and going ten miles through very heavy sand, with ten gallons of 72° gasoline. Furthermore, I might remark that up to within a month of the time of leaving Battle Mountain I had never ridden in a motor car, and knew as little of its construction as the average layman, and that the 1,100 miles was traveled alone (except for my dog) and, with one slight exception, as my own repair man.



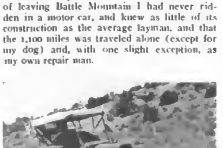
COMBINATION MINE, GOLDFIELD, NEVADA.



DEEP CREEK MOUNTAINS IN UTAH.



THE PATIENT LITTLE BURRO.



THE "ROAD" BETWEEN BELMONT AND EUREKA, NEVADA.

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Rubber

FROM TREE TO TIRE

BY CHAS. QUINCY TURNER

THE rubber tree is one of the paradoxes of nature. It is the most widely known of all our domestic plants, and the least widely known of all our sources of industrial supplies. We are familiar with one of its species, the plant in hall or conservatory, where in grace of outline it has no peer. Tall, clean-shafted, large-leaved of a deep, rich, satiny olive color, stately and hardy, it has become a household decoration, yet few, outside of those engaged in handling its merchandisable product, raw India rubber, know aught of its life story as a denizen of the tropics.

The original cause of this condition probably was, that, up to the time of the advent of its use as a tire to the wheel, whether solid or pneumatic, the use of rubber was to a great extent limited to functions connected with surgery, or to machinery operated solely for commercial purposes, by mechanics entirely indifferent as to from what source the raw material was obtained, from what lands it was gathered, how it was harvested, in what manner it reached our shores, or how it was converted into a form wherein it became of practical use.

Motorists have altered all this. They want to know; yet, curiously enough, this full knowledge of the usefulness of rubber, and the half-hearted, halting, knowledge of the sources from which the raw material of it was drawn, mark all its history. For instance, Herrara, who accompanied Columbus on his second voyage to America, in 1494, became acquainted with its superior qualities of lightness and resiliency over the balls of Castille, by participating in a game of ball with the natives of Hayti, the nearest of the West Indian Islands to the coast of South America; and another early Spanish Governor, Torquemada, in his works published in 1615, discloses the method by which the natives waterproofed the Spanish soldiers' cloaks and made their own rubber shoes; yet it was not until 1751 that a French engineer residing in the little colony on the shoulder of South America, Cayenne in Guiana, sent a scientific description of the rubber-yielding trees to Europe, where it was published in the proceedings of the French Academy; and then, so little were its uses appreciated, that up to the year 1830 a few hundred pounds only of it reached England in a twelve month.

The last quarter of a century, and especially the demand for rubber in the past few years for use in tires, has revolutionized this, and covered the equatorial regions of the whole world with a small army of expert emissaries in search of any trees, and even shrubs, which would yield a sap which certain processes could turn into available rubber. All the world now wants it, and in ever-increasing quantities. America alone last year imported over fifty million dollars' worth. The area of production in its native condition has been extended from South America, to which the knowledge of it was confined for centuries, to the Isthmian states of North America and to Mexico, as well as to Africa, in a belt running across that continent, and to Asia in a similar belt, and even to the islands of the sea adjacent to it.

In the same manner these researches have amplified the knowledge of the class of trees from which available sap can be obtained, and developed the fact that in each continent the sap is derived from a different botanical family. The South American rubber sap of the great Brazilian-Bolivian basin is derived from members of the spurge family; the North American mainly from the mulberry family (although in Mexico there is a rubber bush and in Colorado some of it has been derived from the thistle family); the family supply comes from a giant vine of the dogbane family; and the Asiatic from the fig family, of which the plant of our parlors, familiarly known as "the rubber plant," is the Assam variety (*Ficus elastica*).

With the price of rubber going up by leaps and bounds, there is no wonder that many efforts have been made within the equatorial zones to cultivate the best known varieties in positions suitable climatically, that many a fortune has seemed

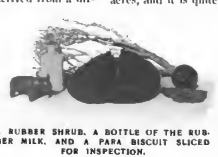


WEIGHING IN ON THE DOCK, NEW YORK.

to be within the range of immediate requirement, for enterprise is ever hopeful, but nature cannot be hurried—she works slowly. The earliest cultivated plantation of 5,200 trees was set out in the Dutch province on the island of Java, off the coast of Asia, in the year 1872, and it was fourteen years afterwards before any of the trees could be tapped. Many other countries have, nevertheless, followed suit, notably Borneo, the Straits Settlements, and Ceylon, whilst in Madagascar a really important factor may be added to the world's rubber supply, on a concession made for that purpose covering 144,000 acres, and it is quite within the range of



LITTLE CUPS INTO WHICH SAP DRIPS AND PALM NUTS FROM WHICH FIRE IS MADE.



A RUBBER SHRUB, A BOTTLE OF THE RUBBER MILK, AND A PARA BISCUIT SLICED FOR INSPECTION.



A PACKAGE IN THE ORIGINAL GOAT SKIN CONTAINERS.

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CUTTING THE FABRIC INTO STRIPS.



PUTTING ON THE FOURTH PLY OF FABRIC.

possibilities that the Philippine Islands may exceed them all in profitable utility.

For all the practical purposes, however, with which we are now concerned, that is to say, rubber for tires, of the finest and best quality, for none other can be used for motor-cars, the interest of the world will, for years to come, be centered on the great South American market of Para, the outpost of the network of rivers which come down to the sea from the remotest parts of Brazil and Bolivia; when the conditions of its growth and ingathering are exactly the same as they were before the Spaniard set foot on the continent, nigh on five centuries ago, and will remain so for yet further centuries.

The only season in that vast area when the trees can be reached whilst the sap is rising, is after the subsidence of the spring floods, which yearly convert thousands and thousands of square miles of tropical forests into lakes. In this parasite-covered, noisome and fetid atmosphere, reeking with the smell of rotting vegetation, the trees find their most congenial habitat. Into this dismal swamp the Indian paddles in his dug-out canoe with his wife and family, all of whom are drafted into the service of the short harvest. On this beautiful, but quaking and fever-breeding bog, into which he often sinks knee deep, annoyed day and night by countless hosts of monkeys, in danger of the poisonous snake and the lurking alligator, and pestered by clouds of mosquitoes, he makes his camp and pursues his vocation as his forefathers did. It is not surprising, under the condition, that five years is the usual limit of his possibilities of participating in rubber gathering, and that one who has passed seven years of it, unscathed, is a phenomenon.

His first anxiety is to locate a circuit of profitable trees—no slight task in the dim, creeping-plant festooned labyrinth. His next is to clear a passage which shall enable him to pass rapidly from one tree to the other in an hourly circuit. This is a heavy labor. When the trees have been selected and the pathways cleared, the trees are divided into groups, each group containing as many as can be attended to by one man, woman, and boy.

The trees are of great height and range from two to three



FITTING THE TIRE INTO MOLDS FOR VULCANIZATION.

feet in diameter at the base, with wide-spreading clusters of oblong, ovate leaves, grouped in threes. Around the trunk at the height of about six feet, that is about as high as he can reach from the ground, the native then cuts in the bark a series of slits in a horizontal line, at a distance of five or six inches apart. Under each of these, he presses a daub of clay, to hold a little *tichela* or cup in which to catch the sap which will flow from each wound for about three hours, during which time the twelve or fifteen cups girdling the tree may have had dripped into them, in the aggregate, a pint of white, milk-like sap. The next day he makes another similar row of incisions some six or eight inches lower than those of the previous day, and so on, day by day, in series, until the ground is reached, when the operation is repeated from the top downward, in fresh circles, until no more sap runs.

The reader will readily apprehend that the Indians, both men and women, are kept on the run, for the trees may be as far as a hundred yards apart, and every tree requires constant watching and practical attention, the cups being, with each shift, carefully emptied into a large, narrow-necked pot, with a handle for carrying, and so precious is every drop that every cup is carefully wiped out with the finger.

The white, milk-like fluid is then taken to the camp, where it is poured out into a large flat bowl, by the right hand side of which sits an Indian boy. On the opposite side of the boy is a narrow-necked, big-bellied, earthenware, vase-like fire pot, in which he has made a fire of the nuts of the Manaca palm tree. This fire exudes a considerable volume of a very acrid smoke. Into the milky bowl he plunges a wooden paddle, around which adheres (just as molasses would) some of the already coagulating rubber sap. As he winds this gummy substance round and round the paddle he passes it over the fire and through and through the smoke. This operation kills the viscid, resinous, albuminous particles of the sap, which, if left in it, would be detrimental to its preservation—would, in fact, set up a quasi-putrefication in it. Many other methods are used in other countries for eliminating these detrimental ingredients, such as alkaline decoctions made of the juice of the achele; lime juice in Africa; alum in Panama; washing with lime in India; but no process has been discovered, either by observing natives in any country, or by chemical experimental science, so effectual in its results in ridding the rubber of deleterious resins, as the smoking methods employed in the South American forests in making the "Para" rubber of commerce, as all that country's product is called, because it reaches the outer world through the port of that name on the Atlantic coast of Brazil.

When the rubber on the paddle is built up, by frequent dippings, to the bulk desired, a deft slit with a knife releases the stick from the "biscuit," as the lump of rubber is called, and the operation of building up another biscuit is begun.

So the season proceeds until it is over, when the biscuits are loaded into the native's canoes in original packages of various materials from coarse vegetable fibre to goat skins, and drifted down a thousand streamlets to the headwaters of navigation of the little fleet of steamers which ply with it down the rapids, below which the larger river steamers carry it down to the sea port.

If, on the other hand, the crude rubber is sent northwestward, it goes by land from Bolivia, over the Cordillera Mountains by pack mules, a climb of thirteen thousand feet over

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FRICTIONING THE RUBBER TO THE FABRIC.



MIXING THE CRUDE RUBBER WITH CHEMICALS.

almost impenetrable jaguar-haunted forests, on narrow, tortuous and unkempt trails, and over the barren, treeless, waterless desert, covered with coarse grass, scorching hot during the day and bitterly cold at night, until the waters of the Pacific Ocean cheer the wayfarer on the western horizon.

The life of the crude rubber at the port of Para is short and simple. It is assembled; each biscuit of the finer sort being split open to determine its quality, sorted into consignments to the American importers, of whom there are not more than half a dozen, and repacked in wooden cases of the usual transhipping size, as large as can be conveniently handled. Up to ten years ago a thousand packages in one ship was considered a record number; but, to-day, anything less than seven thousand packages attracts no attention, and these shipments are made fortnightly.

On its arrival at the home port of New York, each package is opened, and the rubber exposed on the pier and weighed, to determine two facts: First, that the importer gets just what he has paid his consignor for; second, that Uncle Sam may take a record of its weight and value, not for the purpose of taking toll on it, but for statistical purposes, for raw rubber escapes the tariff.

So pressing are the great manufacturers who turn the crude rubber to commercial purposes for its shipment to them in the interior states, that its stay in New York is simply one of being reassorted and divided according to the sales made to each. In fact, in order to meet the requirements of the manufacturers, the reassembled packages are turned over, from the same pier on which it arrived by sea, to railroad trucks, or to another waiting ship going seaward to coasting points. First quality going to one factory, second to another, and so forth, according to the character of goods which each manufacturer requires; for, of course, the quality which is required for the highest type of tires and belts, and for surgical purposes, is not necessary for mats and such like coarser articles.

The first operation of the manufacturer is to remove all impurities of which there are necessarily many—bits of clay, pieces of bark, particles of undestroyed resin, stones, and sometimes even stranger matter. To effect this the crude rubber is softened by hot water or steam and cut into slices which are passed through and through between perforated hollow washing rollers, until the impurities are crushed out of the rubber dough. The resultant is perforated sheets which are dried and passed through masticating machines where, as its name indicates, it is kneaded into solid masses and sheets, which are ultimately cut into the desired weights and sizes, according to their intended use. Either at this stage, or subsequently, according to necessity, the rubber is prepared for vulcanization by the injection into it of various chemicals, the especial formula for which is a trade secret guarded with the most jealous care by each manufacturer. It is colored by mixing ingredients according to requirements, vermilion for red; ultramarine, or antimony, lamp black or oxide of iron. The vulcanization is effected by heat and pressure acting on the chemicals incorporated in the rubber.

The great bulk of the rubber of commerce is ultimately made up into one or other of the two kinds of tires, the solid and the pneumatic. The solid are made (much as lead pipes were) by the plastic rubber being forced through a die; but there are many variations of treatment, some having wires inserted throughout their length, or other devices, to keep them from "creeping" under the weight and friction of running. The splicing of the lengths so as to form a perfect, homogeneous circle is one of the most important operations; great care is necessary to ensure that, in superimposing the skived edges that the sliced portions do not represent in thickness more than the normal diameter.

The base used in constructing the tread of the pneumatic tire is made by laying on and pressing the softened rubber on to a thread ply fabric, through the meshes of which it forms a multitude of infinitesimal rivets, the tire being built up layer by layer, called frictioning, a process which enables it to be molded in as nearly a true circle as possible, and to be vulcanized or cured in what may properly be called one solid mass, yet capable of changing its position in service with the least possible resistance.

Between these two types the processes of which are shown in the illustrations at one of the big tire-making concerns, are an endless variety of ingenious processes and designs, which this is not the place to describe in detail. My task is limited to tracing the life story of the rubber from the tree to the tire of whatever pattern that may be, although it may not be out of place to point out some of the other parts of the motor-car into which rubber enters. The hollow bulb which yields under the pressure of the hand, and forces the air down through the signal horn is one of them. The tube through which the air is pumped into the pneumatic is another, to say nothing of rubber-covered gloves and garments, and the smug and waterproof *ponchos*, with which the motorist is able to defy the elements and ride with pleasure through the most inclement weather.

Motorists, indeed, will be the first to acknowledge their indebtedness to the aboriginal Indian who, out of the acuteness of his observations of the processes of nature, detected and evolved the practical methods by which the sap of the trees of his native forests was made to serve man's needs, especially the traveling man's needs who plys a motor-car, either for his pleasure or his profit.

Some criteria of the bulk and value of the trade in crude rubber may be gathered from the statistical returns of the government, for the past ten years, on another page of this issue.



MOLDING THE INNER TUBE.

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CRANK SHAFTS.

Drop Forged and Lathe Fashioned Compared.

By FRED E. DAYTON.

SINCE there is no one feature of a cylinder-fired, gasoline motor subjected to the same severe excesses of use and misuse as a crankshaft, it is interesting to note the way different builders meet the responsibility of fashioning a crankshaft. From the very nature of its working it can be realized that more has never been asked of metal than the demands made upon a motor-car crankshaft which is subjected to a succession of shocks—explosive shocks—as well as carrying the working load of the motor.

There are two methods used in the manufacture of a crankshaft, and since the method of making has quite as much to do with the success of the finished shaft as the metal of its making, as much thought should be directed in this avenue as in the selection of a proper metal. In Europe the making of a crankshaft has been the slow and laborious method of machining a shaft from cold stock on a lathe. Since practically all American shafts are drop forged, it is fair to stamp this the American method. Necessity knowing neither law nor manners has demanded the drop-forged method to be followed in America, while in Europe, where a higher price is received for cars than in the run of American production, and where the wage scale is considerably less, the machining method has been steadfastly held to.

It is not to be denied that many very excellent crankshafts have been drop forged in America. It is unfair to presume, however, that all American crankshafts have compared equally well with the European crankshafts. In fact, actual performance seems to demonstrate that the European method is the best method.

The element of chance plays a large part in the drop forging of crankshafts, but from this it should not be taken that drop forgings are not successful. For any number of parts no more successful method of making has been devised. Many parts of a motor lend themselves to drop forging. A crankshaft can hardly be placed among this number. Because a crankshaft is so long and so unwieldy forgers often attempt too much in too few heats of the metal, and in the rush of product this is often the case. Two drop forging sins are here committed. The metal is heated beyond cherry red, up to yellow and even welding heat, and this is conducive to a burnt metal, easily breaking under ordinary use and excess strains, and when broken, having the appearance of cast-iron. Then the shaft is hammered when it has begun to chill, in the rush to get it out, and this late hammering has a tendency to bruise the metal, destroying the denseness of the grain and toughness of the metal.

Another feature about drop-forged crankshafts is that the toughest steels cannot be successfully drop forged, hence the drop forged crankshaft suffers a handicap at the very outset. The question of price has had to do with the enforced selection of the drop forged methods employed in America, for a drop-forged shaft can be turned out for approximately one-third the cost of a lathe turned shaft. Another feature which has compelled American makers to resort to forged shafts is the rush of production and necessity of getting cars on the market.

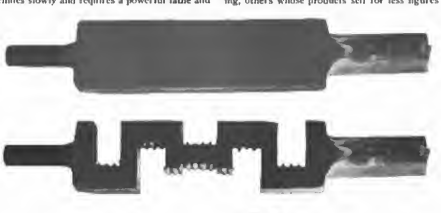
A slab of metal necessary to machine a shaft from weighs approximately 225 pounds. When made of the toughest known steel, made in crucibles, the raw stock costs about 20 cents a pound, making the slab worth about forty-five dollars, or as much as the shaft of a four-cylinder motor would cost complete if drop forged. The squares of the general design of the crankshaft are drilled out by gang drills, and, as there is but small salvage in the waste, hence the cost of material alone is high. Such metal, if of dense structure and tough, machines slowly and requires a powerful lathe and a first-class machine hand from two to three weeks to machine each shaft.

There is hardly an American manufacturer who is rigged up to get out his own shafts, with lathes enough and skilled men enough to do the work. Here then enters another difficulty. This may be partly overcome by letting out the rough machining to several shops equipped with lathes and men to do this work, and the price for this rough machining is close to $1.25 a pound of the partly finished crankshafts. Fixing the weight of such a shaft around sixty pounds shows that this machining has cost $75. Add to this $45 for material, less the waste salvage, and the cost has climbed beyond the point where it is possible to incorporate such a shaft in any but the most costly cars, say those costing over $3,000.

The end is not yet, however, for the crankshaft must have its final machining and have the bearing parts ground to an absolutely round surface, for the day is past when crankshafts can be finished for motor assembly on a lathe with the smoothing done by a file. Such smoothing might mean a thousandth out of round, and even so infinitesimal an amount means an uneven wearing which is soon aggravated into a knock and a pound, requiring attention.

It is hardly possible, therefore, that such shafts will be put into any but the highest-priced cars, and while one American builder has taken up this method of crankshaft making, others whose products sell for less figures will have to cope with the subject of drop forging and exercise a greater care in forging than has been common in other years. With better organizations and the growth of the industry it will be possible to do this in a great measure, and realizing how important this work is many makers are now doing their own forging when formerly the work was let out to drop forge shops under contract.

Since thousand mile tours are now common and since the demands of motoring are infinitely greater than they were in the earlier years of the sport, the very greatest care and attention seems necessary in the manufacture of all parts and no one part of all the parts cries out for finest material and expensive workmanship of a motor as does the crankshaft, the backbone of the power plant.

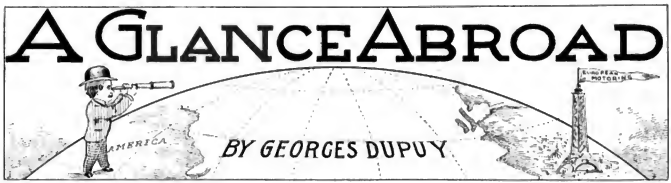


ILLUSTRATING GRAPHICALLY THE LATHE FASHIONED CRANK SHAFT IN ITS SEVERAL STAGES OF MAKING.



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A GLANCE ABROAD



WITHOUT doubt the year 1906 will be one of the most memorable of "Queen Motor-car's youth." In every civilized country her subjects and lovers are struggling more and more for her supremacy and the longevity of her reign. In a very few years she will command the world.

After the splendid New York shows, the wonderful speeds attained on the famous Florida beach, and the brilliant road race in sunny Havana, there seems to be some more interesting business in the drama of motor affairs on the other side of the Atlantic. In France, the natal land of the motor-car and the airship, a gigantic programme recently has been decided upon, comprising the "Circuit d' Europe," a 5,000 kilometer competition across Italy, Switzerland, Austria, Russia and France, promoted by Marquis de Dion; the "Deutsch-Archdeacon prize" for gasoline propelled aeroplanes; the "Grand Prix de l' A. C. F.", a 1,200 kilometer speed contest to be run in two days on the roads of La Sarthe; another road competition for "voiturettes," or light cars, that will take place in the fall; to say nothing of several daring expeditions to South and North poles, where motor sledges and balloons are to be used.

Santos-Dumont, the "king of the air," is actually building an extraordinary helicoptere fitted with a special gasoline motor, with which he hopes to win the Archdeacon trophy, and soon after fly to the North Pole. Comte Henry de la Vaulx, another celebrated aeronaut, and a faithful stickler for the spherical balloon, goes to the directly opposite "unknown," in company with Dr. Charcot, for whom the Paris daily *Le Matin* has organized a second expedition to the South Pole. A first section of the party will journey over the white deserts by means of motor sleighs with screw propellers ploughing the snow and biting the solid ice; the other section, under the supervision of de la Vaulx, will try to reach the antarctic point in hydrogen balloons. Comte de la Vaulx went twice to the Magellan Strait during the last few years and made aerial experiments there.

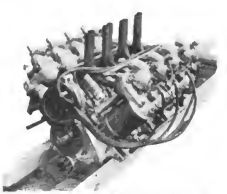
Prince Albert de Monaco is also going to realize one of Jules Verne's dreams with a screw-kite, which Leon Leger, a French engineer, is now building for him in the principality of Monaco.

Out of these remarkable inventions, Santos-Dumont's machine is said to surpass all others of its kind. The little dark Brazilian, as everyone knows, is one of the coolest and most daring men of his generation. He can drive a racing car at top speed with the *maëstria* of a Lancia, and I have seen him more than once, very early in the morning, quietly leave the platform fixed at the highest balcony of his Champs Elysees home, in his No. 9 baby airship propelled by a 4 m. p. Buchet motor, go for a tour over the pines of the Bois de Boulogne, and return for breakfast a couple of hours after, landing precisely at the same place. I believe he will now astonish the world with his helicopteres.

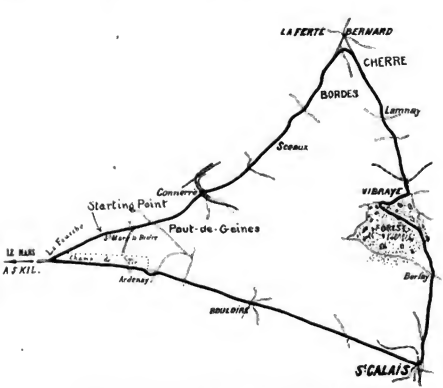
Santos had abandoned the inflated balloon forever as a serious consideration much before the Wright brothers' successes in air hovering were known in Europe; and for several years he has studied the fascinating problem of bird flight and, he avers, is now sure to succeed sooner or later. The motor of his new flying machine (45 degree angle, eight cylinder, built by Levavasseur, of Puteaux) gives as much as 32 motor-power, brake test. The bore is 75 millimeters, the stroke 90. It develops 24 m. p. at a normal revolution of 900 to 1,200 a minute. The exhaust valves are placed on the top of the breeches, and the exhaust pipes stand vertically for the perfect balance of the motor when in motion. A high tension



SANTOS-DUMONT AND HIS EXPERIMENTAL AEROPLANE.



THE 8-CLYINDER MOTOR FOR THE SANTOS-DUMONT AEROPLANE.



THE CIRCUIT DE LA SARTHE OVER WHICH THE GRAND PRIX IS TO BE RUN.

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PICTURESQUE VIEW IN LA FERTE-BERNARD. THE COURSE GOES OVER THE BRIDGE.

THE SHARP TURN AFTER LEAVING LE MANS.

A FINE STRETCH OF ROAD, SHOWING HILL IN DISTANCE, BETWEEN BOULOIRE AND ST. CALAIS.

magneto combined with a secondary current distributor insures reliable ignition. The bottom part of the aluminum crank case bears small lateral banks cast with the piece, so as to retain oil fore and aft when sudden starts in any direction are demanded. The engine itself, with a 450 millimeter flywheel, weighs only 120 pounds. There probably will be a Saurer (compressed air) self-starting device adapted to it.

Besides the great wings of the helicoptre there will be two long propellers which the motor will drive direct by a cardan shaft. These propellers are made of very light aluminum tubes covered at both ends with air-tight, waterproof French silk. The blades are turned to an opposite angle of 80 degrees; their extreme width is 65 inches. Santos-Dumont expects to take his flyer out of its shed, at Neuilly St. James, by the end of March next.

* * * * * *

A motor-car speed contest organized by the Automobile Club of France and known as "Le Grand Prix de l' A. C. F.," will take place in France on June 26th and 27th. For the contest the A. C. F. was offered several circuits of excellent roads between the Seine and Loire Rivers. After careful examination, and in order to give the motors of the contesting cars a most effective trial, the perfectly level roads of La Sarthe were chosen by unanimous vote.

The course, through La Fourche, Ardenay, Bouloire, St. Calais, Vibraye, La Ferté-Bernard, and Connere, is exactly a hundred kilometers, between La Fourche and St. Calais. The roadway is from ten to twelve meters wide (about 35 feet) with clean grass plots on both sides. The circuit of the course will be covered six times, and will be repeated on the next day, so as to make a 1,200 kilometer contest. The road, on its entire length, will receive a coating of special asphalt and crude oil, to a width of 20 feet.

The point chosen for the start is situated at St. Mars la Brière, near La Fourche du Mans. It is here that the stands will be placed. The decision that has been taken in France to run the race in two stages will not fail to cause some surprise, but taking into account the improvements made in racing cars during the past few years, a trial over 750 miles does not seem at all excessive. Entries from every motor-car-building country in the world are being received in Paris at the Automobile Club. The drivers and their *mecaniciens* will be alone in the race. No repairing teams, or tire stations, or firm posts, or outside aid of any description will be allowed. All repairs will have to be carried out *par les moyens du bord*.

During the intervening night, the cars will all be locked up and care taken that no one touches them, so that repairs and replacement will be impossible. At the pistol shot, the first car will almost immediately turn the La Fourche corner, and then the road stretches out in a long straight line right to St. Calais. This is the ideal part of the course and for over twenty miles the road sweeps along through an apparently deserted country, with hardly a bend; a slight curve to the right and then to the left, being made at Ardenay in order to avoid the village. Over this part, the racing monsters will be able to go their hardest. At St. Calais, to avoid a dangerous route through the old, narrow streets, a large semi-circular plankway, raised at an angle of 35 degrees on the outer edge, as at the corner of a cycle track, will be erected partially around the village to join La Ferté-Bernard road.

On leaving St. Calais, the second side of the triangle is entered upon. Here the road is not quite so level, although always very speedy. There is a straight piece leading to Berfay and two easy corners in the forest of Vibraye, before reaching the village. The road passes through Lamney and then La Ferté-Bernard is reached. The cars will turn at the church place, and resume again their top speed until a little before Connere, where there is a long descent with two sharp turns in it. After passing Connere, the last part of the circuit leads back to the starting point.

I have received a letter from Henry Fournier and another from Gustave Callois a few days ago. Both daring drivers say that the circuit is "terribly fast." Several new racing cars will compete. A big six-cylinder Mercedes is under construction now at the works of Unterurckheim, Germany. Real enthusiasm prevails all over France and particularly in La Sarthe, where the great race will cause local business to increase enormously. "Wise" contractors have formed "trusts" for the occasion, as in America; there is the transportation trust, the lodging trust, and the advertising trust, etc., on the circuit.

On the 26th of January last the "Automobile Club de la Sarthe" was created in commemoration of the event. The club has already two hundred members.



THE SPLENDID ROAD GOING INTO BOULOIRE.



ROAD NEAR LA FOURCHE, SITE OF THE GRANDSTAND.

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Part of the Course Near Kepple Gate, Isle of Man

The Motorists' Paradise The Isle of Man

BY KATHERINE ELWES THOMAS.

THE first glimpse of the Isle of Man caught from the approaching steamer's deck is uninviting—bleak, gray rocks, fortress-crowned promontories, lonely lighthouses throwing far-reaching beams, greet the visitor's eye. Closer acquaintance, however, shows it to be a gem of green pasturelands, of a bold but picturesque rock-bound coast, of softly rounded mountains and hills—a home country. And over all is the breath of summer and the sparkle of sunshine.

The Isle is truly the paradise of the motorist. Its fifty-two miles of ancient roadways, rolling through hill and dale, are kept in superb condition—macadamized, and smooth as a ballroom floor. Over these roads the motorist may race and scorch to his heart's content; there is absolutely no speed limit, a rule which the Manxman made to attract strangers to their land, since it is in providing food and lodging that the greater number of the Islanders gain their livelihood.

There have been, up to the present time, three notable motor-car races held on this little Isle of the Irish Sea. The initial Bennett eliminatory trials of May, 1904, having proved eminently successful, were repeated the following summer. Then the International Motor-Car Race held September 13, 1905, attracted so large a crowd of persons of wealth and distinction that a private race was arranged for the following day from Ramsay, which, however, owing to a driving rain, was obliged to be abandoned—a circumstance generally regretted, since the contestants were, to a man, made up of some of the wealthiest and best-known peers of England and Scotland. These contests required four circuits of the fifty-two mile course, making in all 208 miles and 15 furlongs. At the International Motor-Car Race fifty-two motor-cars competed. During that event, as during the previous ones, by order of the Governor-General, every roadway was kept clear of vehicles and people. Behind the safety of moss-grown stone fences, spectators were free to view the contest of speed over the roadways, which, at their narrowest, are wide enough to admit of two cars passing with perfect ease. As a result of these races, within the past six months there has been started the Manxman's Automobile Club, the rules for admission to which are identical with those for the Automobile Club of Great Britain and Ireland.

The course of the last Gordon Bennett eliminatory trials—and, moreover, the best for the motor-car tourist to take—is southward through Douglas, Ballasalla, Castletown, which last town is on the extreme southern part of the route; northward along hilly, winding roads, through Ballacraine to Ballaugh; eastward to Ramsay, then again southward up Snaefell (2,094 feet altitude) and down the other side to Douglas—a total distance of approximately fifty-three miles.

The accessibility of the Isle of Man is a recommendation to motorists. From the Irish coast it is to be reached by fast steamers equipped with ample facilities for transportation,

GREEBA CASTLE, NEAR THE VILLAGE OF ST. JOHNS, ISLE OF MAN, WHICH IS THE HOME OF HALL CAINE, THE NOVELIST.



from either Belfast or London. From the Scottish coast passage for man and motor can be had via rail to Ardrossan (the general shipping port of Glasgow), or from Glasgow direct, by way of the steamer. From England one may sail at will from Barrow-in-Furness, Fleetwood, Heysham Harbor (opened during the season of 1905 at an outlay of £1,000,000); or, most popular of all, by way of Liverpool. At the present time there is no boat from Wales, the passenger traffic being too small to warrant the installation of a regular steamship line. The climate, semi-tropical, is similar to that of Lower California, with warmth of sunshine unknown in the British Isles. Here, the year round, tall palms wave their luxuriance above gardens bordered by thickly blossoming hedges of scarlet, purple, and white fuchsias.

At the last census the population was placed at 70,000. Of this number Douglas, as the leading town, boasts of 20,000. Some adequate idea of the number of visitors to the port of Douglas alone can be gathered from the record of the turbine steamer *Viking* from Liverpool, which daily records two thousand "trippers," as those coming for short stops during the months of July and August are called. In addition to the *Viking*, eight boats a day discharge their load of "trippers" into Douglas. In consequence of the tremendous influx of "trippers" during the two mid-summer months, the best times to visit the Isle are during May, June, September and October.



IN THE TOWN OF BALLASALLA, ISLE OF MAN—A DANGEROUS CORNER WHERE SEVERAL CARS CAME TO GRIEF IN THE INTERNATIONAL MOTOR-CAR RACE IN 1905.

In whatever direction one drives, bordering the roadways and back from these running hither and thither to the topmost swell of the fertile hills and dividing the fields into crazy designs, are hedges of rough, uncemented stone put together after the manner which prevails in New England. The entire surface of the Isle of Man has been given a vast garden effect by the concealment of the stone work under a foot or more of soil luxuriantly covered with thick, fine grass, and topped off with hawthorn hedges. From the window of many of the modest dwellings of Manxland (which one speaks of much as one speaks of Fairyland) hangs a tiny sign, "Refreshments"; for along these quiet ways travelers are plentiful enough during the two hot months, when it would seem as if all England and Scotland poured themselves in a solid stream upon the Isle of Man.



A VISTA OF ROADS—PART OF THE COURSE OF THE BRITISH ELIMINATORY TRIALS FOR THE BENNETT RACE OF 1905; THE ARROW INDICATES THE DIRECTION THE RACE WAS RUN—NEAR KING WILLIAM'S COLLEGE, CASTLETOWN, ISLE OF MAN, SHOWING CASTLE RUSTEN, BUILT IN 1011, IN THE DISTANCE.

Douglas, Ramsay, Peel, and Port Erin are the four towns of importance. In addition to these there are numerous towns and villages in all directions, each in its way charming and replete with historic ruins and legends dating back to the Norse freebooters who descended upon the Isle. No town in the Isle of Man appears too small or unimportant to possess a fine golf course with, in addition, tennis courts and cricket fields. Its proximity to Wales is evidenced in many of the names of localities—Cronk-Ny-Marroo (the Hill of the Dead, Snaefel Mountain, Rhenass Falls, Ballasalla, and Dhoon villages, and the mountain peak on the north shore—Cronk-Ny-Irey-Lhaa.

The residence of Hall Caine on the road leading from Douglas to Peel naturally attracts the attention of all visitors. Yellow gorse tumbles over the low lichen-covered walls, behind which, high upon the terrace, stands Greeba Castle, the writer's home. Behind the castle, which is an exceedingly modest little structure, is a whitewashed stone building—an early deemster's cottage—where the novelist does most of his writing. A deemster, by the way, is a guardian of the deem, or the laws. Such men in the early days, before written laws came to the Isle of Man, memorized the laws of the land. At the present time there are but two deemsters living, the elder lacking but a few years of his centenary.

The most ancient ruin in the Isle is that of Peel Castle. Sir Walter Scott, in "Peveril of the Peak," places the scene of the old legend of the sentry haunted by the Demon Dog in Peel Castle. At the town of Peel is still preserved the old custom of making the annual putting out of the fishing fleet a day of song and prayer, both for those who go out upon the great deep and for those who stay home to wait and watch.

A drive of ten miles from Douglas brings one of the most perfect ancient castle in the British Isles, at Castletown—Castle Rushen, built in 1011. The main body is a square keep with four massive towers. The central keep was the residence of early kings of Man, and later of governors of the place. Subsequently it was used for Parliamentary assemblies; still later a political prison. It was there that for seven years Oliver Cromwell, after the death of Lord Derby, who fell fighting for Charles I, held Lady Derby prisoner, and every night compelled her to sleep behind iron bars in a hole in the stone walls of her bedroom, a space scarcely large enough to permit of her stretching at full length.

Manxmen, although subjects of England, still reserve the ancient custom of enacting their own laws, which are made in the House of Keys, a modest brown-plastered house standing at the corner of Bucks road and Finch lane in Douglas, and this Isle is excluded from representation in either House of Parliament.

Upon Tynwald Hill the early Norse kings, facing the east, annually gave forth the laws of the land. Upon the fifth of every July, in pursuance of this old custom, Tynwald Hill, the Mecca of all Manxland, sees the reading of the laws to the people, first in Manx, then in English.

The Manxman's coat-of-arms, the three-legged man, typifies the contending claims of England, Ireland, and Scotland, with the mailed legs vigorously kicking each claim out. Originally the three legs of Man was a symbol of the sun, which the barbarian Manxmen worshipped as their principal deity. It is now over three thousand years since it was first taken by them for an armorial bearing, having at that time been brought into the Isle by the Norse marauders, on a coin looted from Sicily. Comparatively modern is the motto, *Quocunque jeceris stabit*, or, Englished, "Wherever you throw it, it will stand." In the ancient building at Castletown, the earliest House of Keys, is the inscription:

"Three legs armed,
Armed in self-defence;
Centrally united,
Security from thence."

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Correct Motor Raiment

By Joel Feder

SPRINGTIME MODES FOR MOTORING.

THE race meet on the Ormond-Daytona Beach brought out a great many novelties to interest the motor-car enthusiast of the fair sex. Of course, upon the long stretches of piazza that are such a feature of hotel life at all of the Southern resorts, the sole topic of conversation had about it an atmosphere of gasoline, and kindred matters, such as comfortable and stylish motoring apparel.

Enthusiasts who made the trip all the way down by motor—although there were few—displayed what one might call the rough and ready style of motor garments. Quite a contrast to the balmy weather of the North, where winter seems to have forgotten his abode and had jumped almost into early summer weather, the days of the meet were "hraw" and damp and chill. A north wind, laden with moisture, made furs imperative; and those who were having their first experience in fickle Florida weather were loud and emphatic in expressions of disappointment.

Seasoned old-timers, however, knew well that Florida meant all of their clothes, as one chauffeuse put it. Winter furs, spring tailormades, summery looking linens, and gauzy dinner and dancing frocks, comprised the extremes of the dress trius' contents.

But it was the motor-car that set the pace in both dress and conversation, wherever two or three or four, or even more of the fair sex were gathered together. So insistent was this topic that those real or fancied invalids, who could not be induced to set foot in a motor-car, declaring that their nerves could never stand the pace, adopted the veil, head-gear, and long, loose garments that are supposed to be characteristic of the sport, and in this manner following the old advice to "assume a virtue if you have it or not."



From Durbin & Leviton.

MON BIJOU MOTORING VEIL.

Indeed, one New Yorker confessed that, although her only experience with motor-cars was confined to shopping trips in an electric hansom, she invariably wore a motor coat and a chiffon veil upon such occasions, and declared, with much humor, that saleswomen gave her far more polite and assiduous attention when she appeared so garbed, an unconscious tribute on their part to the power of up-to-date dressing.

And, speaking of veils, the meet brought out some novelties that most assuredly will have a most enthusiastic acceptance from womankind in general, and from motoring devotees in particular. One veil has a hood-like arrangement that is manipulated with running strings to fit comfortably over either the hat or the coiffure. Seen on the counter it looks just like a long, plain scarf. But when the clever *vendeuse* picks it up, throws it with seeming carelessness over her head, pulls a string or two and ties them in a fascinating ribbon bow, one sees that there is a great deal more to this cunning contrivance than appears at first glance. There is a window-pane—to call it that for want of a better or more expressive name—in the front, of *mousseline de soie*, this coming over the face and affording clear vision that will be welcomed by those to whom the average, ordinary chiffon veil proves extremely trying. The hood part is in either a double liberty silk, a *crêpe de Chine*, or in fact any of the light weight and semi-transparent weaves of silk. The running strings referred to are really ribbons, a narrow one to do the running duty, and a broad ribbon of silk, satin, or velvet, as the case may be or as individual preference may suggest, being added so that when the strings are tied the bow of broad ribbon is all that appears. One bow under the chin, and one over the forehead appear. The shopper observed that the saleswoman had astutely pinned one of those invisible hairnets over her well-waved coiffure, so that although she threw this hood-veil on countless times during the day, her coiffure remained unruffled throughout.



From Rendigarian Fur & Leather Co.

SHOWING A NOVEL CUT IN RUBBER SILK.

There is a very clever man-milliner on Fifth Avenue who makes a specialty of motoring headwear. In the case of favored clients he has been known more than once to give a lesson in the artistic, and at the same time practical, draping of those lengths of chiffon that are used for motoring veils. The customer seated before the mirror, the small turban with its piquant mercury wings posed one on either side of the little hat, the hatpins decorated with mercury wings likewise—the latter, of course, in metal and in miniature—he takes the three or four yards length, pins it first to the crown of the hat, then at appropriate places along the close little brim, and instructs the fair wearer just exactly how she is to raise or lower it. The customer must be able to do this for herself ere she leaves the shop; for the famous one has no intention of having—once condescended to instruct—his lesson go for naught.



POSSIBILITIES OF A DRAPED VEIL.

So pretty and becoming have those draped veils proven that the milliners are adopting them as trimming for all sorts of summer hats; so that, in the summer days to come, the veil-draped hat will no longer be indicative of the motorist. But by that time, those clever designers who make a specialty of motoring apparel will doubtless have evolved something that will serve to distinguish the motorist—be she chauffeuse or passenger—from her less lucky sister of the trolley car.

What one might term separate wraps, or occasional wraps, for motoring use are growing more bewitchingly lovely, day

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by day. While those specialists in auto garb are doing everything that their ingenuity can devise to keep motor apparel different and distinct from those garments which are used for other purposes, it must be confessed that the best showings are those which may just as well be donned for carriage as for motoring use.

One garment that attracted much attention was a large cape of persiana, a caracul-looking fur plush that has received quite an amount of attention at the hands of those same specialists. In color it was a dark

One saw all sorts of smart costumes that, while they were, to the initiated, suited exclusively to motor use, displayed so many of the current items of style that one might be pardoned for wearing them on other occasions. One of those had a skirt in lavender—the grayish tinge— broadcloth, laid in box pleats from waist to hem, the pleats widening prettily as the skirt descended. Velvet ribbons of the same tone seemed to run under the pleats, which appeared in graduated widths from band to hem, those at the hips assuming a wavy line, while the



From Schoellkopf, Hutt & Loeber Co.

EQUIPPED FOR ALL WINDS AND WEATHER



From Saks & Co.

WITH ELASTIC RUBBER YOKE AND COLLAR



From Hyndman Co. A. B. Co.

ONE OF THE LATEST FETCHING FASHIONS

smoke gray, and as to cut—well, it was certainly original. Those little dressing sacques, fashioned from pocket handkerchiefs, with which we are all familiar, was undoubtedly the inspiration of its shape, for it hung in fluted folds from the shoulders, and displayed the several points, back and front and sides, that distinguish the pocket handkerchief production. Heavy gold embroidery meandered down the fronts and upon the hem all around. Now embroidery upon fur or fur plush is wont to be rather flat and dead in effect, but a close inspection showed that this work had been wrought upon a princess haircloth, the foundation cut away at the edges of the work, and the embroidery appliqued with gold threads upon the fur.

Beneath this delightfully original wrap was worn a traveling gown of deep *taupe* or moleskin gray velveteen, bands of persiana appearing upon the skirt, each band displaying the same embroidery; and the costume was completed with a little draped toque of that fur, in which the embroideries were again repeated, a big chou of gold tinsel ribbon serving to catch the saucy, stiff aigrette in white that upreared itself at the left side. Rumor credited the costume to a famous Parisian maker, and it most assuredly did spell Parisian luxury and taste in its every line and fold.

lower rows were perfectly straight. Gaiters of the same cloth—the skirt was of walking length—appeared over black patent leather boots.

The coat was a loose sacque affair, rather mannish in cut, with patch pockets and a plain coat sleeve, and coming well over the curve of the hips. This was in an ooze calf, dyed exactly to match the cloth; and the velvet on the skirt was repeated in a collar and cuff, giving a touch of smartness that was fetching. A blouse in lavender satin messaline displayed a chemisette in Limerick lace, which went far to atone for the plain severity of the coat and skirt.

The makers of rubber silk garments have put forth some designs that are charming. Those garments seem to be invented so that they may be slipped on or off with the least possible trouble. A loose, though not baggy, outline characterizes the best of them, and suggestions of dolman shape, odd sleeves, and big, roomy pockets, characterize the leading examples. One design that seems to be favored much has a big, loose sleeve; there is no shoulder or armhole seam. While setting smoothly over the shoulders, the coat descends in full ripple lines to below the knee, where it measures some five or six yards at the hem.

(*Continued on page—*)

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TWO-CYCLE MOTOR.

By E. J. WILLIAMS.

THE motor-car industry has been rather backward in considering the adoption of the two-cycle motor as a power equipment. At the present time there are only two firms who are endeavoring to educate the motorist regarding the feasibility of this type of motor as a propelling power in the motor-car field. One is the Elmore Mfg. Co., the pioneer two-cycle motor-car constructors, and the other, a new convert, the Olds Motor Works, the makers of the Oldsmobile.

For a long time, the two-cycle motor has been maliciously railed at by the partisans of the four-cycle type, but with no apparent reason or grounds upon which to base their criticism and opinion, regarding the improved motor. It must be remembered that up to a few years ago the two-cycle motor was wholly neglected, owing to attention being centered upon the improvement, and toward the perfection of the four-cycle motor, and no effort was made, during that period, in an endeavor to locate and overcome the faults that were said to exist in the two-cycle design and principle.

It is true that the four-cycle type of motor is in favor for motor-cars, but a diversity of opinion exists between marine motor manufacturers, preference being given to the two-cycle, as can be noticed by the dominating existence of this type in marine practice. For marine use in small powers, such as the motor-car may also utilize, the two-cycle motor has, and, according to the outlook, will continue to be in great demand. At the present time the two-cycle outnumbers the four-cycle motor for marine use in powers up to 20 m.p. at a ratio of about ten to one.

The result of the improvements continually under consideration by manufacturers of the two-cycle marine motor will in all probability pave the way toward the further adoption or adaptability of it to the motor-car. The most favorable points in view of its adoption for any purpose are low cost of manufacture, the least intricate of the two types, few mechanical parts, which naturally means less chance of mechanical derangement, and infers less trouble. Furthermore, the two-cycle cylinder has one working stroke, followed by an idle stroke, while the four-cycle cylinder has one working stroke, followed by three idle strokes. This produces only one-half the vibration in the former as compared with the latter, cylinder for cylinder, and more power, permitting of a reduction in weight per m. p. The up-keep or maintenance of the two-cycle motor is also, necessarily, very much reduced, owing to the foregoing reasons.

Non-flexibility as compared with the four-cycle type has been advanced as an argument against the two-cycle motor and so much has been said regarding this feature being specifically with the principle and not with the design, that it has been erroneously accepted as a matter of fact, notwithstanding the results attained by the improvements made in the two-cycle motor within the last few years.

The matter of non-flexibility, and the possibility of back-firing, trouble in starting, etc., was caused by using the two-port, two-cycle motor as shown in Figure 1, which utilized a spring check or poppet-valve to govern the crank case mixture. A great deal of trouble was also caused through the use of a check valve vaporizer, which made starting rather difficult on damp or cold mornings. A piston speed limit also existed with the two-port type, owing to the check valve fluttering at about 600 r.p.m. in a motor of 3½ by 3½ dimensions, and a proportional decrease in the maximum number of revolutions in motors with a larger stroke.

These criticisms have naturally clung to the old style two-cycle principle, although the modern three-port motor has entered the field, which, combined with proper dimension ports, to permit as near as possible the proper speed of the gases, and also to scavenge the cylinder of burned products; improved design of baffle plate, to properly divert the gases from the crank case to the top of the firing chamber; a smaller size crank chamber, to derive a higher compression therein; and last but not least, an improved carbureter, in place of a check valve vaporizer. These changes, as embodied, are making a favorable impression by giving good control, holding its torque at high speed, and a marked degree of improvement over the original type of two-cycle motor.

The entire absence of cams, lifts, gears, secondary shaft, springs, rods, etc., makes it the most simple type of the two to appeal to the prospective purchaser. Considering for a moment the theoretical disadvantages as claimed of the two-cycle motor, even the two-port type, in use in the marine field, there is hardly an owner of a two-cycle motor, who would exchange his outfit for one of the four-cycle type. There is no possibility of a loss in compression with the two-cycle motor, from valve seating troubles, weak springs, worn cams, rods, etc., and it offers the advantage of running in either direction, a much desired factor, without the agency of a reversing gear. This reversing feature is an utter impossibility with a four-cycle motor, without bringing into position and action another set of cams for valves and spark, which means a great many more intricacies and a correspondingly greater liability of mechanical derangement. However, this reversing action is not a necessity in the motor-car.

The greatest amount of data procurable is from the success of the two-cycle motor in the marine field, hence it is imperative that reference be made to this field, when one wishes to consider or weigh the result of this type, when in the hands of the pronounced novice. The marine motor owners, as a mass, personally operate and care for their own outfits. Their knowledge of mechanics is generally meagre, and when a motor is to be purchased the simplest type is the most seriously considered. One of the most favorable arguments bearing on the satisfactory performance of the two-cycle motor is embodied in the fact that the largest stationary motors are of this type, and are used to drive large dynamos. This class of work is the most trying condition to which any motor of any description can be subjected, and the owners of these motors emphatically declare that the two-cycle shows a marked superiority over the four-cycle in cost of maintenance, sensitiveness to good governing, and economy, the latter claim being strictly the reverse to the theory claimed by those who uphold the four-cycle motor.

Waste of fuel in the two-cycle motor of small powers, up to the adoption of the carburetter, or perfection of the check valve vaporizer, more commonly known as a generator valve, was a thing generally known and acknowledged. The spitting effect of the poppet-valve during its seating action, amounted to quite a loss of fuel during a few hours' run. With the coming of the three-port motor, and modern vaporizer or carburetter, especially for this type, a pint of gasoline is, conservatively speaking, good for one motive power hour, in either the two or four-cycle motor. Some motors of the same principle use less, others more, all owing to the excellence of design and clearance or compression space utilized.

Up to this year only one firm of motor-car manufacturers held to their belief in the ulti-

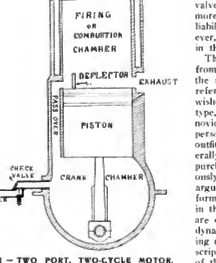


FIG. 1—TWO PORT, TWO-CYCLE MOTOR. CRANK CASE INLET GOVERNED BY CHECK VALVE.

The operation of this two-port, two-cycle motor is as follows: As the piston moves on its up stroke, a suction is created in the crank case, which opens the check valve in the pipe leading from the vaporizer, permitting a quantity of explosive mixture to be drawn in. Upon reaching the top end of the stroke, as the piston starts on its downward movement or stroke, the check valve closes, shutting off the supply of gas, and retaining the crank chamber charge, which is lightly compressed by the piston movement. At the completion of the down stroke, the piston uncovers the pass over port, the compressed crank case charge enters the cylinder firing chamber, strikes the deflector, and is diverted to the top of the cylinder, and the piston starts on its up stroke, closing the port, and compressing the new and fresh cylinder contents. As the top center is reached, the compressed gas is ignited by the spark, forcing the piston downward by the expansion. While the gas was being compressed in the cylinder, a new charge was drawn into the crank case from the vaporizer and compressed by the following down or expansion stroke just mentioned. When the piston, on this expansion stroke, nearly reaches its bottom center, the exhaust port is uncovered shortly before the pass over port uncovers, which gives an opportunity for the burned gas to escape. The new gas enters the firing chamber as the pass over port uncovers, repeating the foregoing operation. The check valve as diagrammatically shown is not always a separate attachment, more often found as a part of the check valve vaporizer.

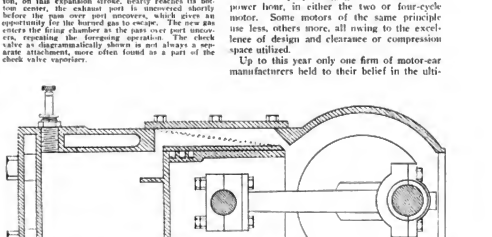


FIG. 2 SHOWING 1905, THREE-PORT, TWO-CYLINDER HORIZONTAL ELMORE MOTOR.

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mate success and prospects of the two-cycle motor, the Elmore Mfg. Company, who in 1902 started to manufacture the two-cycle motor-car, after having carefully considered the feasibility of utilizing this motor, and basing their future by the favorable reception and results derived from the two-cycle motors in the marine field. Last year's Elmore motor was of the horizontal three-port type, with two cylinders, which gave two impulses at each revolution of the fly wheel, which is each down stroke of the piston or equal to a four-cylinder four-cycle motor. Anticipations have been more than realized, notwithstanding the false deductions against the use of such a type in the motor-car.

At the New York show the two-cycle Elmores were a 24 m. p., having a three-cylinder, vertical, three-port, two-cycle motor; the other was a four-cylinder model of the same design, giving a m.p. of 35, the dimensions of both types being 4½ by 4. The absence of the slightest possibility for mechanical derangement was one of the most impressing features of this type of motor-car, and the manufacturer's contention is that it is merely a matter of evolution, and that ere long it will be universally adopted.

A three-cylinder, two-cycle motor receives the same number of power impulses each revolution as that of a six-cylinder, four-cycle motor, and a four-cylinder, two-cycle, twice that of a four-cylinder, four-cycle, thus equaling an eight-cylinder, four-cycle motor.

The oiling system, the carburetor, and the spark is all the apparatus requiring any looking after in a two-cycle motor. In the Elmore this is reduced to a minimum. Lubrication is effected by the use of a Hill's preeision oiler, the positive action of which is such that any obstruction will be forced out of the oil duets or tube, thereby providing a sure feed at all times, with practically no attention whatever except to keep the tank filled with oil.

The carbureter is of the Schebler type, which is especially adaptable, and permits of a proper proportion of air and fuel at all speeds, which it is claimed is the remarkable range of 150 to 1,500 r.p.m. An auxiliary damper in the throttle is arranged in the mixture pipe between the carbureter and the crank ease inlet port, and connection is established between this throttle and a small foot pedal on the footboard, by a small rod. This secondary apparatus is to prevent the motor from raeing when the clutch is thrown out suddenly, and can also be used to govern the speed of the motor, in addition to the regular throttle manipulated from the steering column. Mixture troubles with the Elmore are unknown with this type of carbureter as constructed, and one of the most conspicuous instructions to purchasers, upon which specific stress is laid, is "Leave the Carbureter Alone."

Ignition is by jump spark, using a Pittsfield spark coil, the plugs being situated in the center of the cylinder head, which is considered the proper location when utilizing the jump spark and the oval type of cylinder top. Control of the motor is also by spark advance, handled from the steering column. At slow speed with the spark retarded, one of the gravest features that always existed with the old original type of two-cycle motor, the persistent back-firing, called crank ease explosions, caused by the ignited charge, igniting the crank ease contents through the pass over port. In some cases this continued and refused to stop until the spark had been materially advanced.

In the Elmore motor an original idea has eliminated all possibility of back-firing. This was used on last year's motor as well, and consists of the introduction of a piece of fine mesh wire gauze set across the pass-over port at an angle, as shown in the sectional drawing of last year's type. A modern adoption eleverly executed of Sir Humphery Davy's safety mining lamp.

One other noticeable feature of the three and four-cylinder Elmore motors, is the readiness to start, without cranking, by turning on the electric current, and rocking the spark advance lever. In the two-cycle motor, there being no valves, the spark plug is the only

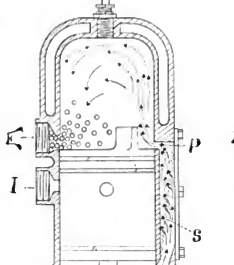


FIG. 3.—MODERN THREE-PORT, TWO CYCLE MOTOR.

In the two-port, two-cycle motor shown in Figure 1, a charge of explosive mixture is drawn in on the up-stro ke stroke of the piston, while in the three-port, two-cycle type, a section of partial vacuum prevails until the inlet from the vaporizer is uncovered and permits an amount of gas to enter the crank chamber, equal to the displacement of the piston during the stroke movement. The operation of drawing in the charge of gas, its compression, ignition, expansion and expelling or exhausting the burned products, in a four-cycle motor requires twice the number of cylinders as the two-cycle motor requires per revolution to do the same work. This method of operation is accomplished at every revolution of the two-cycle (two strokes of the piston) motor, while the four-cycle motor has to pass through two revolutions or four strokes of the piston. In the two-cycle motor, two operations are therefore under way at each stroke of the piston, one in the crank case, the other in the firing chamber, at the same time.

In the illustration the circles indicate ignited gas, and the arows the fresh, unexploded gas. Two positions of the piston are shown, one at the bottom center or end of the stroke, the other at the top. *E* exhaust, *I* inlet from carbureter, *P* pass over port, *S* gauze screen to prevent back firing.

place where the least and only chance is for a leak to occur. With the piston in one of the cylinders, in a position somewhere between the top and bottom center, enough gas is always found contained within one of the cylinders to start the motor by the spark. One owner of this make of motor claims to have used his car several months, and never needed to crank the motor from the day of purchase. Experiments conducted on an Elmore motor-car proved that the motor would readily start by the spark after eight days of idleness.

Compression of the gas in the cylinder is not

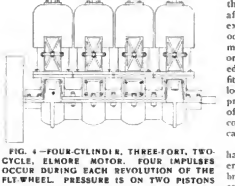


FIG. 4.—FOUR-CYLINDER, THREE-PORT, TWO-CYCLE, ELMORE MOTOR. FOUR IMPULSES OCCUR DURING EACH REVOLUTION OF THE FLYWHEEL. PRESSURE IS ON TWO PISTONS ALL THE TIME.

The above four-cylinder motor is made up of three castings, cylinder without head and upper and lower half of crank case. The side plates on the cylinder cover the pass over, and facilitate the removal of the wire screen. Access to the crank case is through the side plates on the upper half as shown.

strictly necessary to accomplish this starting feature. With a new outfit, and all the parts rather stiff, compression does assist to some extent, but after a few weeks of use, the mere presence of gas, when ignited, will naturally raise the pressure within the cylinder above atmospheric pressure, and force the piston through part of a stroke, until another piston has passed the center, and the operation is repeated, gaining momentum by the following pistons, until a fresh charge of gas under full compression starts the motor up to full speed.

With the foregoing equipment all drawbacks to this type's introduction into the motor-car industry, have been overcome. Care and attention of the motor has been reduced to the lowest stage, and all that remains to look after is the fouling of the spark plugs and exhanstion of batteries. An ingenious method, found only on the four-cylinder Elmore motor, for locating the fouling of a plug or individual coil trouble or poor spark, noted by the unsteady action of the motor, is the fitting of several small, single-pole switches located on the dash-board, and cut in on the primary or timer circuit, governing the spark of each cylinder. By opening each switch consecutively any difficulty of non-sparking can be easily located.

A number of special two-cycle motor-cars have been constructed by various manufacturers and individuals in the last year or two, but the only company outside of the Elmore concern, who have had the temerity to add a two-cycle motor-car to their regular 1906 outfit, are the makers of the Oldsmobile. For several years this concern has put out what they considered the simplest outfit for the ordinary motorist. This was a single cylinder,

(*Continued on page 62.*)

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MODERN MOTOR CARS.

ROYAL TOURIST

ROYAL Tourist—Syn.—an American gentleman's touring car—of 40 motor-power, which so conclusively demonstrated itself as superior to freak racing cars in the eliminating trials for a place on the



ROYAL

American Vanderbilt team, still retains for 1906, as in the past, Hogarth's famous line of beauty, and curved lines are everywhere in the body construction, a most notable feature of the Royal models being the rounded, beehive shape of the radiator, bonnet and dash.

The motor is of the four-cylinder type, 5-inch bore by 5½-inch stroke, with mechanically operated valves, the exhaust on one side, the inlet on the opposite side, the valves being interchangeable, the spark plugs are located over the inlet valve and are swept by the fresh gases, never getting dirty. The cylinders are cast in pairs. Bronze bearings are used throughout the motor, with the exception of the wrist-pin bearings in the connecting rods. The wrist-pin bearings are of ground and hardened steel. All bearings have ample surface and will not need replacing in less than a year's time. The fly-wheel is of large diameter, bolted to a flange, which is integral with the crankshaft. Fiber gears are used on the cam shaft, making the gears absolutely noiseless. All wearing parts on the cam mechanism are carbonized and hardened.

The crankshaft is a solid drop forging, and is ground to size. The commutator is situated on top of the cylinders of the motor, where it is easy of access. A gear-driven, centrifugal pump, with a hardened, ground gear and shaft takes care of the water circulation; so that the gear and shaft on this pump are practically indestructible. Provision is made for examining the connecting-rod bearings, and, if necessary, removing same without dismantling the entire motor. This is done by removing the large hand-hole plate under the lower half of the motor.



ROYAL CRANK SHAFT

A conical leather-faced clutch is used, of large diameter, having flat springs placed under the leather, so that the starting of a car is progressive, owing to the clutch taking hold easily and gradually. No adjustment is ever necessary on this clutch. A full universal joint



ROYAL ARCHED DASH

is used between the clutch and the transmission case, thus making it unnecessary to have the motor absolutely in line with the transmission.

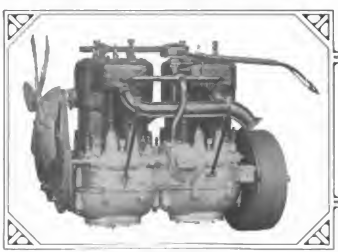
The transmission is of the sliding-gear type, having three speeds forward and one reverse, with the direct drive on the high gear. The bearings in the transmission are annular ball bearings, of the Hess-Bright make, this being the type of bearing that has met with so much success in foreign cars. All the gears are of exceptionally wide face, carbonized and hardened; special grades of steel are used throughout in the construction of this transmission. All the gears are bolted to flanges, so that no dependence is placed on keys or set screws to hold the gears in place. The flanges to which these gears are bolted are of one piece with the shaft, so that they cannot work loose.

The universal joints and propeller shaft on this car are exceptionally robust, and all the wearing parts are hardened.

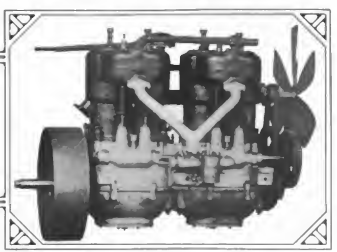
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ROYAL GEAR CASE AND TRANSMISSION



EXHAUST SIDE



ROYAL MOTOR

INLET SIDE

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POPE-TOLEDO, TYPE XII

AN "abundance of good things" briefly tells the story of the 1906 Type XII Pope-Toledo, illustrations of which are given herewith; price, $3,500 fully equipped. It will be noticed that the general lines of the body have been slightly altered. The tonneau is exceptionally roomy, the rear seat accommodating three persons comfortably; then there is a lift seat between the rear and front seat on which two may be seated, providing for the comfortable carrying of five in the tonneau. This lift, or third seat, is provided with a simple arrangement whereby it may be easily lowered, so as to rest directly back of and below the front seat, being entirely out of the way. The double side entrance is wider than on former models, affording ample room for entering and leaving car. On the inside of each door is located a large leather flap pocket, and there is also a triangular flap pocket on the right- and left-hand side of the tonneau, directly next to the pockets on the doors. The upholstering of the front seat and the tonneau is of soft, rich leather, very deep, and so designed as to be very comfortable and easy riding.

The steering wheel consists of an aluminum spider and rim on which is mounted above and below half rims of Circassian walnut wood. The steering arrangement is of the irreversible worm and segment type. The control is graduated from five miles per hour on the high gear to the limit of speed. Operation is by spark and throttle levers situated on steering wheel; ignition being by jump spark coils and batteries.

The rear mud guards are made of aluminum, oval in shape, following curve of wheels; front guards are very wide and fitted with patent leather protection strips extending between engine hood and guard. There is also a patent leather protection strip between frame of the body and running-board step on each side of car for protection from dust, mud, etc.

The steel frame is straight-sided, tested to a safe load away above what is actually required. The wheel base is 104 inches and the tread 54 inches.

The emergency brake, operated by the outside hand lever, as well as the foot brake, are of the internal expanding type, engaging a drum on each rear wheel. In applying either of these brakes, the engine clutch is automatically disengaged.

The axles are of the I-beam construction and are made from steel testing 110,000 pounds tensile strength to the square inch.

The wheels, 34 by 4, are assembled and spoked by hand in their own factory. Ball bearings of very large dimensions are used.

Superiority of double chain driver over bevel gear-driven cars is claimed by the manufacturers of Pope-Toledos. According to their ideas, the double chain drive is decidedly more flexible and efficient, requiring less care, and, by reason of its flexibility, the motor, transmission and chassis are not subjected to sudden and violent shock. In corroboration of their views, they cite the conditions attendant upon the elimination trials of the Bennett Race, in France, in which, out of seventy or eighty cars, over 50 per cent. of the entries were shaft-driven cars, and, of all that qualified, but one was shaft driven. This car was not able to make even a showing in the final race against cars of chain drive. They further state that extensive and exhaustive tests made in France during the past season conclusively demonstrate that the double direct outside chain drive as used on Pope-Toledos shows greater efficiency, longer life, less replacement and less loss of power.

No further back than a year ago it was considered good practice to have 100 pounds of car weight to one motor-power. How much has been accomplished in this new Pope-Toledo not only without sacrificing strength, but by actually increasing strength and durability, can best be understood by stating that this car has one motor-power for every 54 pounds of weight. This achievement not only provides for less wear on tires, but less wear on all other working parts. The motor is of the four-cycle type using twin heads and four individual cylinders copper water-jacketed. The motor develops 35.50 motor-power and 44 motor-power under brake test. In this motor, in addition to the other special features, the very remarkable accomplishment has been attained of securing one motor-power for every 108 pounds of motor weight without sacrificing in any particular the necessary strength and durability.

All gears are encased in an aluminum cover so arranged that a magneto may be attached.

The water circulating pump is of centrifugal type, using a positive drive by gears from the cam shaft.

The carbureter, an original type of improved design, of maximum efficiency, ease of control, is fed by gravity, the average consumption of gasoline under ordinary touring conditions being one gallon for every 17 to 18 miles.

The Hill precision mechanical oiler used on Pope-Toledo cars is designed especially for their use. It is located on the motor arm close to the exhaust pipe, thus arranging for the proper temperature of the oil under all climatic conditions; but one pump is used for the entire set of six feeds, no check valve being used in any portion of the lubricating system. The feed is positively automatic, requiring absolutely no attention after having been adjusted. Sight feeds located on the dash are of simple design encased in a polished brass housing and plainly show the quantity of oil that is being forced through each feed tube leading to all parts requiring lubrication.

The muffler is so constructed as to perfectly silence the exhaust with a minimum amount of back pressure.

The illustrations of the transmission show the general arrangement of the gears, and the gear box or transmission case, which is aluminum alloy in two parts, divided horizontally. The transmission is of the sliding-gear type, three speeds forward and reverse, with direct drive on the high gear, and is suspended upon transverse members of the frame. In addition to this support, the jack shaft brackets are hung between, and rigidly bolted to, the vertical flanges of the side members of the frame. This arrangement forms one complete and secure unit of frame and transmission, preventing any loss whatever of power between motor and sprockets, due to wringing and twisting of the frame. The brass bushing supporting the differential gears has been greatly lengthened and stiffened, maintaining the joined ends of the two jack shaft members rigidly true to one another.

The bearing system has been greatly improved, rendering the adjustment of the bevels perfectly secure. The bearings on the countershaft are made plain and of bronze for the purpose of precise alignment and to maintain their alignment under very severe strains and the wear of daily use.

Under heavy strain, the gears of a transmission are liable to be removed from their proper mesh by separation, should the transmission casing not be sufficiently strong. The bottom of the Pope-Toledo transmission case, both on the outside and inside, is heavily reinforced by webs, in addition to possessing perfect strength otherwise, making the casing absolutely rigid, providing for the gears being

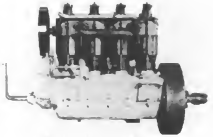
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POPE-TOLEDO, TYPE XII. LIMOUSINE.



POPE-TOLEDO SIDE ENTRANCE AND ROOMY TONNEAU.



POPE-TOLEDO MOTOR.

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The Magneto.

BY ALEX SCHWALBACH.

ONE of the best known forms of ignition by magneto, both high and low tension, is that known as the Simms-Bosch, their make-and-break form being very popular abroad. Some form of make-and-break ignition is largely used on such well known foreign cars as the Mercedes, Brasier, Darracq, Fiat, Mors, Rochet-Schneider, De Dietrich, Martini, Clement, Zust, and others, while a few American makers, such as the Locomobile, Columbia, Matheson, Hewatt, Haynes, Cleveland, Studebaker, and Rainier, also use it, the magnetos, however, being divided up among different makes. We are indebted to the *Motor Cycle Trader* for the text and illustrations concerning the Simms-Bosch high tension device, which is new here, reserving the make-and-break form, which is more commonly used here, for another article.

In the system we are now about to describe, we have the following conditions which it will be necessary to keep in mind in discussing the type. We have:

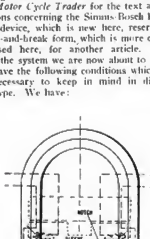


FIG. 1.

(1) A stationary armature and a stationary field.

(2) A rotating sleeve around the armature and between it and the field.

(3) A secondary winding on the armature forming a high-tension circuit, and thus doing away with the necessity of a coil.

(4) A distributor directly attached to the machine.

(5) A method of timing the ignition relatively to the position of the rotating sleeve around the armature.

In Fig. 1 we have an end view of the machine in which the permanent field magnets, the stationary armature, and the revolving sleeve are all clearly indicated. In dotted lines will be seen the four carbon brushes and their holders which form the distributor and which take up the current of the high-tension circuit from the indented piece of metal (shown in cross-section in Fig 1, which rotates on an insulated ring with the rotating sleeve. The rotating sleeve causes the lines of force to be broken, not twice, as in the case of the magneto machine, which uses a rotating armature, but four times for each revolution of the sleeve. As the distributor has four wipers or brushes, it is obvious that the machine can be run at half the speed of the motor if the latter has four cylinders. If it has two cylinders the magneto machine can be run at one-fourth the speed of the motor.

It will be noticed in Fig. 1 that there is a notch in one edge of the rotating sleeve. When the notch is exactly opposite one edge of one of the field pieces, as shown, it indicates exactly the position where the lines of force are cut, and where the greatest potential of current is obtained. In fitting one of these magnetos to a motor, the gearing should be so arranged that this position is obtained when any one of the pistons is about half an inch away from the top of the cylinder on the compression stroke. It does not matter at all which cylinder, but if one of the cylinders is in that position at the time the rotating sleeve is in the position shown in the diagram, then the timing of the ignition will be right. The distance given (1/2 in.) from the top of the cylinder will vary slightly with the type of motor. Where high speed and high compression are used, a shorter distance will do. Where slow speed and low compression are used, an even larger distance (say, perhaps, 3/4 in.), may be adopted as the ignition point. This is known as the "piston lead," and varies with different motors, but the variation is slight, and the figure we have given will be found in most cases to be practically correct.

In Fig. 2 will be seen an exterior view of the complete machine.

We will now endeavor to explain more fully the mechanism of the machine, and for this purpose we refer to Figs. 3 and 4, the former being an end view and the latter a cross-section diagram. Referring to Fig. 4, first we have a view here as if the machine were cut in half along the vertical line through the amature axis. In this view, 1 is a shaft rigidly held in the outside case of the machine at the right side by a cotter pin shown in cross-section. This shaft supports the armature around which the primary and secondary winding of the coil are made. The left-hand end of the armature runs free inside the spindle, carrying one end of the revolving sleeve 7.

The low-tension current from the armature is controlled by a make-and-break contact-breaker 5, the bottom end of which is raised four times in each revolution by a face cam on the end of the revolving sleeve 7. The screw 4 adjusts the contact points, while the contact breaker is kept normally in contact with this screw by the spring 6, until it is lifted out of the contact by the face cam described. The contact-breaking lever 5 can be swiveled round on an axis co-incident with the contact points, and in a direction away from and towards the observer of Fig. 4 by the lever 19. This lever is operated from any convenient part of the car, and advances or retards the point of contact breaking, thus advancing or retarding the time at which the

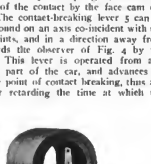


FIG. 2. THE SIMMS-BOSCH MAGNETO.

current in the high-tension circuit sparks across the sparking plug in the motor. The usual condenser is fitted with a shunt across the primary circuit. The condenser is shown at 20.

Two of the distributor brushes are shown at 13 and 14; they make contact with an inlaid brass segment on an insulated ring on the end of the revolving sleeve. Their exterior appearance is shown at 14 and 14 in Fig. 3. Electric leads are connected with the four distributor brushes leading up to the insulated piece 16 (Fig. 3), on which the four terminals to the plugs are situated.

The high-tension current is taken from the secondary winding of the armature by means of the conducting wire 9 carried in a curved arm 2. This conveys the current to the distributor by means of the spring-pushed carbon brush to constantly in contact with the insulated ring 11 on the rotating drum 12, on which is the segment making contact alternately with the four brushes of the distributor. The safety jump spark is interposed at 17 and 18.

25 and 25 are two oilers consisting of spring-pushed wicks in an oil chamber, which feed the oil up to the two bearings of the rotating sleeve. The cotter which holds the fixed armature against the pull of the field magnets is shown more clearly at 26 and 27 (Fig 3).

The arrangement of the wiring will be more clearly shown in Fig 5. This figure is, of course, quite diagrammatic and does not show the actual relation of the parts. For instance, the distributor is shown separately at the right of Fig. 5.

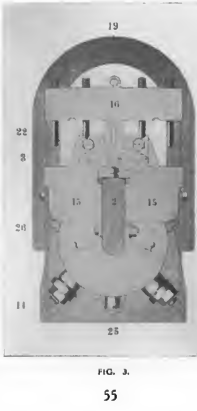


FIG. 3.

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From this diagram the wiring will be plainly seen. The low-tension winding is complete on the armature, and flows so long as the contact points of the contact breaker are in contact. As soon as these are separated by the cam, the interruption of current takes place. At this point of time the high-tension current is at its maximum, and is also suddenly broken by the stoppage of the low-tension current. At this point also the distributor is in contact with one of the four feeders, and the current flows to that of the sparking plugs in the cylinder which happens to be in metallic communication with the brush making contact.



FIG. 4.

In this diagram, the shunt to the condenser and the spark gap will be plainly seen, as well as the four wires leading from the four distributor brushes to the four cylinder sparking plugs.

As will be understood, this type of magneto is complete in itself. It must be geared, as explained, to the motor positively, either by means of toothed gears, or by a chain, and the timing of the two should be as indicated. The only connections to be made to the machine are the four high-tension insulated wires from the four terminals on the machine to the four spark plugs in the cylinders, which are of the usual type as used with high-tension coil and accumulator ignition.

THE CHICAGO SHOW.

(*Continued from page 32.*)

minds and has been wrought out by processes of long and gradual evolution in which every step, even the tentative freak ones, has been suggested by practical use. So that a device may be abandoned in the hope of escaping the inevitable drawback which offsets all mechanical things, or a device may be abandoned because it cannot be made well enough, or cheap enough, or easily enough. For instance, the use of the magneto and the make-and-break spark which is the best instance of present day reversion to type, although it has been continuously used from the first by some of the best makers abroad.

Sometimes the condition of public demand or a freak of fashion may cause the makers to change a thing mechanically. Changes are also sometimes made to gratify the craving of the public for new things, and when the list of possibles comes to an end, the maker goes back towards the beginning all over again, just like the preacher who tips over his full barrel of sermons and starts in afresh on the other end. As an example let us suppose the following: The chain has some drawbacks and therefore is gradually displaced by the bevel gear, and entirely goes out. The bevel gear develops drawbacks in turn, provoking fresh complaint, and after some years of trouble with it some maker brings out a chain drive with a variation which is hailed with delight, and boldly written up as a great novelty of the year. One by one other makers follow suit until the gear is again abandoned, so that improvement has gone around the block and come back again on its own way, the disadvantages of the old form having been found by trial to be less than those of new, so this supposed case, which is partly real as everybody knows, illustrates progress by reversion.

Among the real novelties of the show was a Chicago product called the "Silent Knight."[1] The motor of this car has no poppet valves or springs, the pistons moving up and down inside of a light cast-iron sleeve, these sleeves being moved in opposite directions by short connecting rods having a one-inch throw and driven from the main shaft by enclosed gears. The sleeves have port openings at the top and bottom somewhat similar to the two-cycle and steam cylinder construction. The inner sleeves moves with the piston but somewhat slower, the outer sleeve moving at all times in the opposite direction, so that the ports are opened and closed at the correct time.

These ports have very much larger opening areas than an ordinary poppet valve, as both the opening and closing of the ports is very rapid on account of the sleeves moving in opposite directions; a fixed head carrying the usual piston rings projects downward into the inner sleeve, the explosions taking place between this head and the piston, so that a closed combustion chamber is provided without the use of gaskets. The cylinders are 4½ x 5 developing 40 m. p. at about 12 r. p. m.

The oiling system is novel, consisting of four atomizing tubes fitted to the bottom of the crank case, and these tubes, through the operation of a three-way piston plunger valve through the power of the exhaust gases throw a fine oil spray into the crank case and there by tubes to the transmission and differential. Control of the valve and the exhaust pressure is by a helical cam operated according to the number of exhaust impulses and which can be varied, of course, by the driver of the car.

From Dubuque, Ia., came the new Adams-Farwell of 40-45 m. p. It has a five-cylinder horizontal, revolving, air-cooled motor, which is placed in the rear of the car, the size of the cylinders being 5 x 5. Control of the motor is by variable compression system. This motor must not be confounded with a rotary engine because it a revolving motor, the cylinders revolving around the stationary crankshaft. The pistons reciprocate in the cylinders and each cylinder is complete with its head and part of the center of the crank case cast in one piece. All the cylinders are bolted together and bolted to a top bronze flange, and bottom cast steel flange, bronze bushed, forming bearings around the vertical stationary crankshaft, the whole revolving element forming the flywheel and cooling fan.

It is claimed that all motors exert a torque in two directions during the power stroke. This torque tends to turn the crank and with it the flywheel over in one direction and an equal torque tends to turn the motor cylinder, casing, etc., in the opposite direction. Now an ordinary motor has the cylinders and casing fastened to a foundation and cannot turn; the crankshaft, of course, does turn. On the Adams-Farwell the crankshaft is fastened and cannot turn, but the cylinders do the turning.

An ordinary motor transmits its power from the crankshaft; the Adams-Farwell transmits its power by bevel gear from the revolving crank case. All the pistons are connected with a single crank pin of very large proportion by connecting rods, and these connecting rods with the pistons at their outer end swing around the wrist pin, being in perfect balance. There being an odd number of cylinders—five—the explosion occurs in perfect rhythm in each alternating cylinder, so that there is always one cylinder on the explosion stroke giving a constant torque which cannot be had with a three or four cylinder motor.

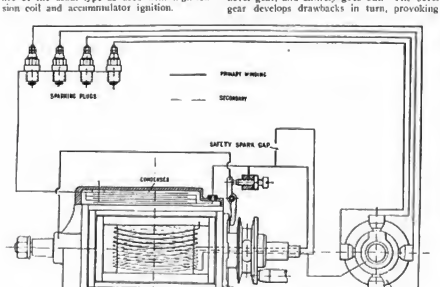


FIG. 5

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FOUR-WHEEL DRIVE TRUCK.

THE illustrations show the new model four-wheel drive truck made by the Four-Wheel Drive Wagon Co., of Milwaukee. It is bevel gear-driven to both front and rear axles, there being no chains employed anywhere in the truck. The old machine which the company has operated now for nearly a year with entire satisfaction is driven by chains, which do not present a neat appearance, and are apt to cause a great deal of trouble. But some feats the old chain driven truck is constantly doing prove the value of four-wheel driving, as follows: It will climb a 13½-inch curbing from a stand still; it has carried five tons through mud with all chains and sprockets dragging; it has carried six tons through snow over two feet deep; it has pulled forty-four tons behind it, while carrying eight tons itself, up a three per cent. grade; it has pushed a five-ton load of cement blocks over a 8-inch curb and an embankment up on to a vacant lot in order to leave the blocks handy for the builders; it has traveled seven and one-half miles an hour on a good road carrying seven to eight tons; it has several times been used to pull teams out which were stuck in the mud with heavy loads.

This four-wheel drive truck has for a motive power a four-cycle, four-cylinder, water-cooled gasoline motor directly under the driver's seat. Behind the motor, mounted with it on a three-point suspension frame, is the variable speed or transmission gear. The motor's power is applied through the transmission gear to a shaft which, in turn, through large sprockets and a chain, drives the main propeller shaft. The propeller shaft is divided in the middle by a ball and socket joint, and through bevel pinions at the front and rear ends, drives the corresponding sets of wheels.

Three differentials balance the power and speed applied to the wheels; one on each axle, and one on the rear driving shaft near the ball and socket joint. All moving parts are encased as far as practicable, in order to make them dust-proof and to facilitate the external cleaning of the truck.

The front and rear live axles are both driven in the following manner: Extending backward from the primary shaft of the transmission is a driving shaft, which terminates in a large sprocket, which is connected by a 4½-inch Morse chain to a second sprocket on the main propeller shaft, all encased, running in oil.

This propeller shaft is divided in the middle by a universal joint, which allows the transmission of power through the angle necessitated by the height of the center of the shaft above the axles, and allows for depression of the springs. The sprocket on the propeller shaft is pressed over a differential, which balances the possible difference in diameter, due to wear, between the front and rear sets of wheels.

The sprocket and differential are on the rear half of the main propeller shaft near the rear axle. Each half of the propeller shaft carries a bevel pinion on its outboard end, which drives the respective axles through bevel gears. A roller in the same plane as the propeller shaft takes up all thrust and lateral strain of the bevel gears.

The propeller shaft is enclosed entirely by a casing continuous with that of each axle. A ball and socket joint in this casing covers the universal joint at the center of propeller shaft, and an enlargement of this same casing encloses the main differential, sprockets, and chain, described above.

All four wheels are steered by a horizontal shaft hung on bearings under the frame, terminating at its front end in a gear sector which meshes with worm on steering column, the latter operated by the ordinary steering wheel. Steering arms on each wheel are yoked with the arm on the opposite side, and this yoke is connected by toggles and arms to steering shaft. Rotation of this shaft turns the front pair of wheels to the right, and rear pair to the left, or vice versa, and with the same angle ratio. Rear wheels track perfectly with the front pair on any curve.

The wheels, which are of the disk type, consist primarily of a series of wedge shaped blocks arranged radially about a malleable iron hub. They are held in place by bolts in the hub; by an outer metal flange keyed to the hub, and by shouldered retaining rings which are shrunk on and bolted to them near the periphery on both inboard and outboard sides of the wheel. These blocks are of second growth rock elm, treated by a special process, and will far outlast any rubber tire. Between each wooden disk a steel plate of the width of the tread is driven in flush with the tread surface. In this way the life of the wheel is greatly increased, and a better holding effect of the tread is secured.

The wooden part of the wheel is built up of wedge-shaped blocks, ready to slip over the hub. When so worn that the wheel is running upon the retaining ring, replacement is easily made, the entire process of replacing a set taking only a few hours' time.

The bearings which carry the wheels are ¾-inch balls in cones upon an oscillating or bearing ring, which is mounted on two vertical trunnions upon the forked end of the dead axle. These trunnions serve as pivots in allowing the wheel to be turned in steering, and correspond to the spindles and steering knuckle universally used in motor-car construction. All four wheels are driven by shafts running on roller bearings inside of the hollow dead axles. The shafts simply drive and carry the load. At the outboard end of each is a universal joint of special design, embodying great strength and a self-contained lubrication system. The outer fork of each universal joint ends in a squared

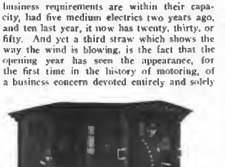
(*Continued on page 82.*)

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Motor Business Wagons

MEDIUM-POWER ELECTRICS.

NO special pleading to convince the business world that the medium power electric has especial merits, is needed; the leaders of the business world, who may not themselves know the difference between an electric motor wagon and a turbine engine, have settled that point, and the fruits of their selection can be seen practically everywhere. Wherever the center of large business is, to which the prompt and repaid removal from the place of sale to the home of the purchaser is a *desiderata*, there will be found the ubiquitous medium power electric car pushing its way to and from every point of the compass; and in ever increasing numbers, too, which is even a stronger testimony to its appropriateness for the special use to which it is best adapted. That is an unanswerable argument in their favor, the verdict in dollars of the men who have tried them. Wherever a concern whose business requirements are within their capacity, had five medium electrics two years ago, and ten last year, it now has twenty, thirty, or fifty. And yet a third straw which shows the way the wind is blowing, is the fact that the opening year has seen the appearance, for the first time in the history of motoring, of a business concern devoted entirely and solely



FLEISCHMAN'S "FLOWER" CAR.

to the making of them, to the exclusion of pleasure cars.

If you ask the business man, who has made these ever-increasing investments, why he has done so, you will not get an elaborate exposition of the mechanical perfection of the vehicles, but just one unanswerable, chop logic, brief reply: "Because business motor wagons are the cheapest form of haulage yet discovered for my requirements." If the merchant is good natured enough to extend the scope of his reply, which some are, you will find in the final analysis that his reasons divide themselves into two groups, one of which is equally applicable to all forms of motor-cars, gasoline and steam, as well as electric, and the other group is special to the electric alone. Of the former group, there is, like the other motor forms, the elimination from the business necessities of large stable areas, and special yards, and a whole string of necessities, each of which with the horse as the power required a special staff. Of the latter group, there is the fact that the electrics are even more economical in their demands for space than either of the two other forms. They have, too, another very marked advantage, they require no special building in which they can be stored. Fire insurance companies have special rates where gasolines are stored, whereas electrics can be stowed away, as thick as they will stand, either in the basement or in the top story of ordinary business premises.

The next special claim made for them lies in the fact that they can be driven by anybody who knows his right hand from his left, and has the sense to pull a steering lever



EDISON ELECTRIC EMERGENCY CAR.

with the right and move the controller forward gently with the left hand, reversing these actions in stopping. The importance of this simplicity of control is palpable. It not only has its effect in a lower scale of cost of driving, but it extends the available number of persons who can, when needs be, be put into the service, to such an extent as to preclude the possibility of delay by reason of the regular driver being absent.

Like the gasolines they have widely extended the area over which the operations of a firm of retailers can be profitably carried on, even when the outer circle of that area may lay within a zone which has no facilities for recharging, because such cars as we are now considering have a capacity to carry a full load variously up to forty-five miles without recharging, and that distance may be increased by the fact that in most cases a portion of the load is being delivered on the journey out, and the whole of it before the machine is turned homewards, and an empty car will travel farther on the same quantity of electricity than a full one.

In the case of firms of large requirements, the charging presents no difficulties whatever, for electricity in other forms, as light and power, will be generated, and a portion of it can be utilized for the cars. Where a public supply is indispensable there are more difficulties, but these are fast disappearing. If the current is direct and the voltage is too high it can now be regulated by the use of a rotary converter. If it is an alternating current, the most usual event, it can be diverted into a direct current either by a motor and generator, or by an arc rectifier.

The cost of the power used is, under the most extortionate circumstances, so infinitesimal as to be hardly worth consideration, although the price varies as much as from 10 cents per kilowatt, where monopoly has its clutch on a localities, to 2½ cents, where there is healthy competition: but even at the highest figures the cost of the force will not approximate more than 1 cent per ton per mile. Moreover, they have no water to freeze, no oil to candy, and no cranking.

All business vans capable of hauling a load up to 2,000 pounds may be grouped under the term medium power, and the chassis of such a delivery wagon will usually have a wheel base of 60 inches; 36-inch wheels, with 3½-inch solid rubber tires; I-beam frame, with full platform spring at both ends, and two motors, of 82 volts, 20 amperes each, which transmit power to the rear wheels by double reduction gears and individual chains, and a battery of 42 cells with a capacity of 168 ampere hours at a 42 ampere discharge rate. Such a vehicle will run approximately 35 miles on one charge at a normal speed of ten miles an hour.

The construction of the chassis necessarily varies according to the individual design and make, one following one principle, one another. That followed by the "Columbias" of the Electric Vehicle Co., which have been found eminently serviceable by such users as the Adams Express Co., the Edison Co., Macy's Department Store, and many others, is based upon the fundamental principle that the battery, the motors, and all apparatus for transmitting power to the driving wheels, should be carried above the springs of the vehicle,—in other words, that all locomotive parts should be supported by the body frame. Another widely known form is the Waverley Electric one-ton truck, i.e., 2,000. They have a carrying space, in length, of 5 feet 3 inches, and width of 3 feet 4 inches, and are in height 4 feet 8 inches, and a single motor,



U. S. EXPRESS MOTOR WAGON.

double reduction, and double side chain drive, and a battery of 42 cells of 11 P. V. Exide. Such a machine costs for charging for a full journey of full weight at the highest rate, 50 cents, and it will run upwards of 40 miles with a full load. Some of these cars have been in constant daily use for five years, and after covering 50,000 miles are running as good as ever. To quote the testimony of satisfied buyers would be a work of supererogation; the market and ever increasing demand is a sufficient testimonial.

Many other firms are busy turning out electric business wagons of which the oldest is probably the Vehicle Equipment Co., of Long Island City, following whom may be mentioned the Parsons Electric Motor Carriage Co., of Cleveland, O.; The Lansden Co., of Newark, N. J.; The Auto-Car Equipment Co., of Buffalo, N. N.; The Pittsburg Motor Vehicle Co., of Pittsburg, Pa.; the Studebaker Co., of South Bend, Ind., and others.

The ability to design electric cars admirably adapted for the especial purposes which they have to serve, however, is not confined to the professional engineer. One of the most effective in the metropolis, both in capacity and in appearance, which may be seen daily at the Hoffman House corner, in Broadway, was designed by, and made for, its owner, Mr. Fleischman, the florist of two continents.

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Diamond

Announcement Extraordinary

THE MARSH RIM

"Quick As Wink"



The opening of the locking ring with any small tool permits of its ready removal.



The inner tube can now be removed in part or entirely.

The Quickest Safest and by all odds the Best. The illustrations show how easily it works.



With the locking ring removed the outer flange of the rim slips readily off.



Or the tire can be taken from the wheel if desired. The reversal of the operations illustrated will return the tire to place again. No tire easy bolts used.

THE DIAMOND RUBBER CO.

AKRON, OHIO

JONES SPEEDOMETER—

the pioneer Speed Indicator—owes its success to its practicability. While first considered a luxury, the improved device, with its adaptability to the great variety of pleasure and commercial vehicles became a—NECESSITY. Since its origin our Speedometer has been recognized as the STANDARD instrument.

Our success in meeting the most exacting requirements as regards permanent accuracy, durability and simplicity of construction has given the JONES SPEEDOMETER an international reputation and has made us the largest manufacturers in the country for this class of instrument.

Owing to the great demand for the instruments last Spring, our factories were unable to make prompt delivery on all orders. This temporary short supply caused several attempted and inferior copies of our device to be placed on the market. The unsatisfactory results to buyers of these poor imitations caused a great number of complaints to reach us, many purchasers believing that they were instruments of our manufacture. We therefore WARN all intending purchasers that there is only one JONES SPEEDOMETER and that is manufactured in New York, and has the words "Manufactured by Jos. W. Jones, New York," engraved on the dial.



We have extensively increased our manufacturing facilities, so that all who place orders early will be able to secure reasonably prompt delivery this Spring.

Jones Speedometer, 135 West 32d St., New York.

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G&J TIRES

The Fastest Time Ever Made by Any Moving Vehicle

Was made on

G. & J. TIRES

By the

STANLEY STEAMER

AT ORMOND

One Mile, 28 1-5 Seconds



THE STANLEY CAR HOLDS THE FOLLOWING WORLD'S RECORDS:

Distance.	Record.	Driver.	Time.
1 Kilometer	World's	Marriott	:18⅖
1 Mile	World's	Marriott	:28⅗
2 Miles	World's for Steamers and American Cars	Marriott	:56⅗
5 miles	World's	Marriott	2:47⅘
15 Miles	World's for Stock Cars	Durbon	13:17

Every one of these records was made on regular G. & J. Tires, selected from stock shipments; and the tires were never changed, nor even blown up from the time they left the Stanley Factory at Newton until they returned there.

The same set of tires went through the preliminary practice and the entire meet, without so much as having a pump put to them.

Is this not convincing proof that G. & J. Tires are THE FASTEST AND BEST TIRES MADE?

Write us for full information.

G&J TIRE CO.

INDIANAPOLIS

Depots

Chicago, Detroit, Boston, Buffalo, Cleveland, Denver, San Francisco, Philadelphia.

Distributing Agencies

Minneapolis—Plant Bros. Portland—Keats & Co.
Los Angeles—Ramsay-Hutchins Rubber Co.

WANTED

A MAN WITH A NEED

If you want to buy anything, if you want to sell anything, if you want a Chauffeur or Mecanicien, if you want anything in the world of motoring, you want

MOTOR MESSENGERS

A little "Want Advertisement" or MOTOR MESSENGER in the next issue of MOTOR will give results to fit your needs.

In a few words, write your "want" and mail it to MOTOR with the price of the MOTOR MESSENGER at

5 CENTS A WORD



The Mesinger Non-Skidding Tire Band

To be used on Wet Roads, Snow and Ice.

Size	Price	Size	Price
28x3	$6.00	34	$8.00
30x3	7.00	36x4	8.00
32x3½	7.50	35	8.50

H. & P. MESINGER MFG. CO., 1801-1807 First Ave., New York

TIRE REPAIRS The largest and best equipped repair shop in America.

N. Y. B'WAY RUBBER TIRE CO.

Brooklyn Branch, 1113-1 Bedford Ave. 253 W. 47th St., N. Y.

For advertisements received too late for classification see the last five advertising pages.

THE TIRE PROBLEM.

THE rivalry that has sprung up, in the matter of naval construction, between the manufacturers of guns and those of armor plate has been the subject of much pleasantry. The artillerymen invent a new gun which succeeds in penetrating and demolishing the existing armor plate; and the metallurgists immediately get to work and manufacture new plates which are proof against the new shells. Then the artillerymen begin to study the gun again, and so on.

This is a good joke that has been carried on for many years, at the expense of the taxpayers, to the great profit of metallurgical works, and it does not seem to be anywhere near coming to an end.

As regards the motor-car, we have something similar. Manufacturers construct types of chasses of given weight which are capable of furnishing a given speed. The manufacturers of pneumatic tires succeed in producing types which pretty nearly give satisfaction under the conditions in which the problem is proposed to them. They no sooner reach a result than, for one reason or another, the weight of the chassis or that of the body, or the dead weight to be carried, or the speed greatly increases, and the pneumatics, which were satisfactory up till then, wear with lamentable rapidity or vie with each other in bursting.

We have already had an opportunity of seeing tire manufacturers tear their hair in such cases. As soon as the normal and practically admitted speeds exceeded 25 miles an hour, the pneumatics of the epoch began to heat, the customers to howl, and the manufacturers to mourn. But everything gradually calmed down, and, in a relatively short time, we had tires that were capable of withstanding a speed of 37 miles an hour. Scarcely was this result obtained than manufacturers conceived the idea of constructing carriages with side entrances and with elongated chassis for the reception of very comfortable, but very heavy bodies. Then again the pneumatics began to prove inadequate, customers formulated their complaints to all the echoes of the road, and the manufacturers of chassis resumed their quarrel with the manufacturers of tires.

Everything was settled again, and tires with triple treads were created that did good service on fast vehicles and touring carriages. The inimical brothers beame reconciled, and every one was contented.

But all at once the eternal problem was proposed anew. The Bennett Cup had been the occasion for a massacre of pneumatics, especially in the elimination trials. The manufacturers of tires asserted that this was nothing astonishing, and that the fault was not theirs, but that of the "Auvergne rasp." Their pneumatics were good everywhere else, but the natal air and specially the natal soil availed them nothing here. The cup circuit was a "rasp in which there are too many turns" (certainly an abnormal condition for a rasp). Here the matter rested.

Despite all, the Ardennes circuit and the competition of industrial vehicles present the problem of the wheel anew in a clear and inexorable manner. It seems to be demonstrated that pneumatic tires, as they are at present constructed, have in races of several hundred miles, a difficulty in withstanding average speeds greater than 60 miles an hour. On the other hand, it seems also to be proved that there is an immense progress yet to be made in the matter of tires for heavy weights, and that it is absolutely urgent that such progress shall not be too long delayed.

Upon the whole, it is the problem of the tire that must be solved in order that the automobile industry shall not be retarded in its development.

In what direction will the solution be effected? It would be difficult to say just now; but whether it be a question of cheap carriages or of industrial vehicles, it will be necessary to sensibly diminish the daily expense due to the wear of the tire. If we succeed in doing this, and succeed we shall in a very short time, the patronage will at once immensely increase

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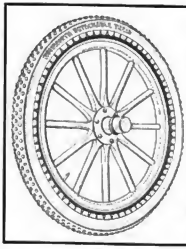
Telephone 3787-Bryant Expert Workmanship Guaranteed

J. A. HARRISON

Rubber Tire Vulcanizer



1555 BROADWAY NEW YORK CITY
Between 46th and 47th Streets
All flakes of Domestic and Foreign Tires Repaired Promptly



START THE SEASON RIGHT

Protect your tires with the Woodworth Detachable Tread. Why risk punctures and skidding and wear our expensive tires when you can get our protectors for less than one-third the price of new tires? You can put them on in fifteen minutes and make your tires puncture-proof, non-skidding and free from further wear.

Write for circular giving description and prices. Agents wanted in unoccupied territory.

Leather Tire Goods Co.
SOLE MFRS.
Newton Upper Falls - Mass.

SANS' Vulcanizer

Don't send your tires to the repair man

PUNCTURED SPLIT or TORN — No matter how bad they are; DO IT YOURSELF. It takes 10 minutes—costs a few cents and NO BILL TO PAY

If you send it to the shop they will use anyhow **Vulcanizer** **SANS'**

SOLE U. S. AGENT
International Motor Car Supply Co.
TELEPHONE, 1157-38th 41 W. 33d St., N. Y. City

THE
NEWMASTIC FILLING
MAKES PUNCTURES IMPOSSIBLE
ADAPTED TO CLINCHER and SINGLE TUBE TIRES
Prolongs the life of the tire, making it practically indestructible, and
AS SAFE AS A SOLID TIRE
Does not affect resiliency. Write for particulars
NEWMASTIC TIRE CO. - - St. Louis, Mo.
CHICAGO, ILL., and LOS ANGELES, CAL.



St. John Non-Puncture Auto Tire

Space J, Basement 69th Regt. Armory Automobile Show January 13th to 20th

Auto and Cycle Tire Manufacturers

THE HAPPY MEDIUM
The St. John Solid Rubber Cushioned Tire

The greatest tire man's ingenuity ever produced.
The tire that solves the most vexing problem now presented in both the manufacturer and private owner of automobiles.
RESILIENCE AND DURABILITY. Perfectly RESILIENT, but saves one-third the power lost in pneumatic tires. Fits regular Single and Clincher rims. Easily applied.
Adopt our tire and save annoyance and expense.
Write for our 1906 Catalogue with testimonials, etc.

THE ST. JOHN RUBBER TIRE CO., Inc.
116 Broad Street New York
69th Regiment Armory, Jan. 13-20, in Basement

FOR SALE
Imported Renault Car

14 H. P. Landaulet; also equipped with extra open body. In first-class condition. A quiet, reliable car, handsomely fitted up. Price, $3,500.

Address TOWN
Care of "MOTOR"
1789 Broadway New York City

1906 Motor Car Directory

CLOTH BOUND
$1.00 PER COPY

MOTOR,
1789 BROADWAY
NEW YORK

Save Time, Money and Trouble and GET MOST WORK out of

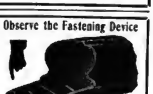
MOTZ CLINCHER TIRES

Observe the Fastening Device



Tire Fastener for Heavy Work

Solid Rubber or Cushion Types and made to fit any standard clincher rim in which pneumatic tires are used
RESILIENT AND "THERE WITH THE WEAR"



The Fastener for Ordinary Work

THE MOTZ CLINCHER TIRE AND RUBBER CO. Akron, Ohio, U. S. A.

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GOOD ENOUGH FOR THE KING OF ENGLAND.

"In view of the great success which has recently attended the "doings of the 'Continental' tyre, alike in races, competitions, and at exhibitions, it is interesting to note that His Majesty, the "King's latest car has been fitted with the new pattern "'Continental' tyres of a specially large size of the non-"skid pattern. The car, which is fitted with a powerful "engine, has a heavy covered-in carriage body, and, conse-"quently, a great strain is thrown on the tyres, and in view "of the fact that a carriage for the use of the King must "necessarily be free as far as possible from tyre troubles, "the compliment paid to the 'Continental' Tyre is "worthy of notice."

The above information was sent to us from our London office.

THE CONTINENTAL CAOUTCHOUC CO.
W. TISCHBEIN, Prest. EMIL GROSSMAN, Gen. Mgr.
43 Warren Street NEW YORK
Factory, Hanover, Germany

SKID PROOF RUBBER TREAD



Are to the Automobile what a Rudder is to a Ship, by its perfect Traction prevents all slipping, steering and skidding Gives perfect control of the car on all conditions of surface, greater durability and more speed. Order them on your new car. Paid

Made and sold by all the best tire makers and furnished by all automobile manufacturers and dealers. See them at all the automobile shows. *Send for free booklet.*

C. J. BAILEY & CO., 22 Boylston St., Boston, Mass.

ECONOMIZE ON TIRES

We can rebuild your old tires at less than half the cost of new ones and will guarantee better than two-thirds the service a new tire would give. **Guaranteed** repairing done immediately on receipt of tires. Write for detailed information.

D. E. FOOTE RUBBER COMPANY
71 Frankfort Street CLEVELAND, O.

ANTI-PUNCTURE

Is Proof Against All Punctures

A Rubber Composition Easily Applied to any Pneumatic Tire

Will Not Rot Tires

WE CAN PROVE IT

Saves the Incessant Tire Expense

Has Stood All Kinds of Tests and Is Fully Guaranteed

Agents Wanted Everywhere

Demonstrates that "Anti-Puncture" is your tire duties say otherwise.

American Anti-Puncture Tire & Auto Co.
1603 Broadway, New York City

PUNCTURES are instantly repaired by the use of Park's Auto Cement.

Absolutely guaranteed that heat will not affect this cement the hottest summer days. Sample cans, sufficient for 30 patches, post paid, 35c.

F. B. PARKS CO.
173 Prescott St., Grand Rapids, Mich.

For advertisements received too late for classification see the last five advertising pages.

FOUR-WHEEL DRIVE TRUCK.

(*Continued from page 57.*)

in the driving plate of the wheels. This plate is doweled and bolted to the outside of the hub.

The brakes are of the internal expanding type, drums for which are cast integral with hub, thus relieving the universal joints of all strains consequent upon stopping the truck suddenly. The most important feature of the brake is, in case of breaking of any part of the driving shaft or propeller shaft in ascending a grade, the application of the brake direct to drums on the wheel precludes all possibility of running backward down hill. This system of applying a brake to a wheel which steers and drives both is original.

The motor is of a standard design, mounted on a three-point suspension sub-frame. It is especially adapted for heavy service and amply powerful for any emergency. The four cylinders are cast separately with integral water jackets and are carefully machined and ground. Circulation is by gear pump driven by crank shaft. Ignition is by Remy magneto and jump-spark system.

Circulating water is cooled by a radiator, and two fans driven by belt to crank shaft. The cam shaft and valve gear are easily accessible by hand holes. The bearings are all extra long and bronze bushed.

Inlet and exhaust valves are interchangeable, mechanically operated, and on the same sides of cylinders. The transmission gear, of a standard sliding gear type, giving three forward speeds and reverse, is mounted on the motor sub-frame. A universal joint connects the primary shaft to the crank shaft of the motor engine. By this suspension, perfect alignment is maintained in the change-speed gearing at all times, irrespective of the spring or twist which the truck frame may undergo.

The frame is of cold rolled ship channel steel with the flanges outward. It is bent in one piece and braced at the four corners, insuring the necessary amount of stiffness at the angles, but allowing of flexibility between front and rear ends. Stiffness amidships is secured by bow-string trussing on each side of the frame.

TWO-CYCLE MOTOR.

(*Continued from page 52.*)

four-cycle motor-car. Last fall they seriously considered the possibilities of the two-cycle motor, and after experimenting for several months, wound up by equipping one type of their this year's car with a two-cylinder, two-cycle, vertical motor. The bore of each cylinder is 5½ inches and the stroke the same, the two cylinders producing, it is claimed, a m.p. of 20 to 24.

In general design and outline, the motor cylinders resemble the Elmore practice with the exception of the location of the spark plug, which is situated in the side of the upper part of the cylinder, on the same side as the pass-over part.

The Hill precision oiler is used, oiling from both sides of the cylinder. The carburetor is of their own design, and the minimum number of revolutions is claimed to be about 350 r.p.m. Both spark and throttle control are used, and a gauze wire netting is set across the pass-over port to prevent crank case explosions.

Few persons not interested in motor-cars or motoring, realize the advantages and comfort embodied in a car that is free from mechanical troubles. The modern three-part, two-cycle motor has the best valves possible to make, but these are in the form of parts cored in the cylinder wall and governed by the piston movement. No attention to them whatever is necessary, and they remain during use in the same relative position to each other and to the position of the piston and stroke as the day in which the motor was built. At the present time, the only thing appearing to be left, in line with the recent improvements to idealize this type, would be to produce a two-cycle motor with twice the m.p. on the four-cycle motor of the same dimensions.

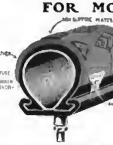
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WALLWORK'S

NEW PATENT 1906 DIAMOND PATTERN

Non-Skidding and Re-treading Cover

FOR MOTOR TIRES



Better and cheaper than having tires recovered

Any person can put on or take off in a few minutes

Cannot come off on the road

THOUSANDS IN USE IN EUROPE

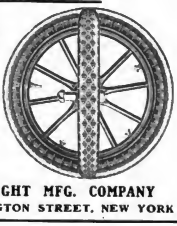
TO FIT ANY SIZE TIRE OR WHEEL

Made from the Best Chrome Leather and Metal

IT IS PUNCTURE PROOF

Very little dust caused, as no vacuum is formed under tread. No car should go out without several of our Patent Garters in case of accidents.

An old worn-out tire is made equal to new when our Patent Cover is put on. The resilience is not affected in any way.



THE WELLS LIGHT MFG. COMPANY

44 AND 46 WASHINGTON STREET, NEW YORK

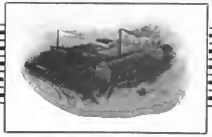


Electric

THE LARGEST INDEPENDENT



TIRE PLANT in this COUNTRY



"PANTHER"

Heater-Cured Wrapped Tire

"PANTHER," Covered Tubes Guaranteed not to Pinch, Blow Out, or Tear. More pure rubber, stronger and more durable than any tire made.

ALL SIZES

WE HAVE AN INTERESTING PROPOSITION TO MANUFACTURERS OF COMPLETE CARS. WRITE US.



Electric

RUBBER MFG. CO.

Rutherford, N. J.



MORGAN & WRIGHT AUTO TIRES

Interesting Facts Concerning the Manufacture of These Much-talked-of Tires.

Although built along general lines which are familiar to most tire users, there are several features in the manufacture of Morgan & Wright tires that will prove of interest to Motor readers.

The real foundation of any tire is its fabric construction. What steel girders are to a building, the several layers of fabric are to a well-built tire. There are six of these layers in M. & W. tires, each laid by hand, and having between them—in order to avoid destructive chafing—a layer of high-quality friction rubber. These fabric layers not only serve to retain the tremendous air pressure from within, but act as a veritable fortress against the severe abuse which every tire must receive from without.

Naturally the quality of this fabric must be of the highest possible grade. Not only do Morgan & Wright use the best Sea Island cotton obtainable in its manufacture, but a fabric expert is kept at the mill which supplies this product, whose duty it is to examine every ounce of fabric intended for M. & W. tires and to accept only such of the product as is absolutely without flaw.

Morgan & Wright have demonstrated that by a special method of *building* these several layers of fabric, their natural strength can be greatly augmented, and this method is employed in *all* their tires.

Again, by so shaping this fabric as to give the completed tire the identical shape when *deflated* which it naturally assumes when inflated, the intense strain to certain portions of an abnormally-shaped tire, caused by high pressure, is almost wholly obviated.

The tread of these tires is made from a stock that possesses almost incredible toughness. This tread is amalgamated to a body of pure para, the combination giving the tire the toughness necessary to prevent undue wear and the resiliency essential to comfort.

Morgan & Wright tires are wrapped *thread* and wholly cured in steam under a process which positively prevents the wrinkling of fabric so common (and disastrous) in tires that are partly or wholly *moulded*.

The uncommon durability and the freedom from trouble which characterize these tires is the best possible *proof* of the correctness of the *Morgan & Wright* method of tire-making.

MORGAN & WRIGHT TIRES ARE GOOD TIRES

MORGAN & WRIGHT, Chicago

New York, 214 W. 47th St.
Philadelphia, 117 Warren St.
Boston, Motor Mart.
Cleveland, 1829 Euclid Ave.
Dayton, 416 E. 5th St.
Minneapolis, 708 Hennepin Ave.
Detroit, 226 Jefferson Ave.
Atlanta, 34 Edgewood Ave.
St. Louis, 538 N. Vandeventer Ave.
Denver, 1562 Broadway.
Los Angeles, 840 S. Main St.
San Francisco, 1067 Mission St.
Portland, 86 Sixth St.
Syracuse, 214 S. Clinton St.

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PENNSYLVANIA CLINCHER TIRES

are made for service—not for profits.



The $1,000 Tire Economy Competition concerns every owner or driver of a Motor Car; especially in the fact that he can send us his old tires and receive 20 per cent. allowance for them in buying Pennsylvania Clincher Tires.



New York: 1665 Broadway
Philadelphia: 615 N. Broad Street
Chicago: 166 Lake Street
Boston: 167 Oliver Street

PENNSYLVANIA RUBBER CO.
JEANNETTE, PA.

SPECIFY OLEO SPARK PLUGS
FOR YOUR AUTOMOBILE



Guaranteed for service, absolutely soot proof, will give results under any conditions.

Oleo Spark Plugs in porcelain and mica. Magneto Spark Plugs. Wire and Terminal attachments in hard rubber and metals. Electrical appliances of all kinds. Special fixtures made to order to meet individual requirements. Manufactured by the Societe L'Oleo, Paris, France.



The General Public are cautioned not to purchase any of the products of the Societe L'Oleo, except those articles imported direct by the Viqueot Company in accordance with its special arrangements.

Sole Representative and Licensee for Patent and Trade Mark Rights

THE VIQUEOT COMPANY.
Works: PARIS, FRANCE

General Office and Salesrooms, 215-217 W. 48th St., N. Y. City

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This AUTO TIRE is both DURABLE and LIVELY

When you buy an *ordinary* Auto Tire, you have to decide a difficult question.

Is it best to get a hard, inflexible tire, which will rack your bones and soon put your car out of business, but which will *last a season or more*

Or—

To get a soft, resilient, easy riding tire, which will go to pieces in a short time because it won't stand the wear and tear of the road?

Momentous question.

And either way you answer it—you lose. Because if you decide on the *hard* tire, it means breakdowns on the road, and consequent liberal use of a farmer's team. It means constant repairs to your engine, a car always in the shop. Your own aching joints are thrown in for good measure.

And if you select the *soft* tire, it means punctures, tire explosions and tire troubles generally. And you have to buy new tires every little while.

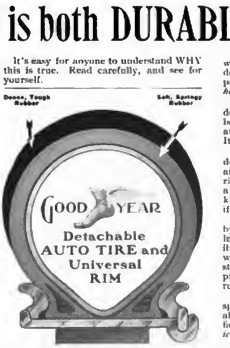
It's Money,—Money—Money, either way.

You'll envy Rockefeller before you get through.

Now you can *dodge* this momentous question if you will.

Because the Goodyear Detachable Auto Tire has all the GOOD points of both the *hard* and the *soft* tire with the bad features of neither.

It's easy for anyone to understand WHY this is true. Read carefully, and see for yourself.



First, look at the section of the Goodyear Tire in the center column. Notice the crescent shaped portion in solid black where the wear of the road comes. That's dense, firm rubber, as tough as rawhide—practically no wear out to it. It's what the *hard* tire is made from.

Now right underneath this is the remainder of the outer tube (shown in grey) which is made from pure para rubber, as resilient and springy as it is possible for rubber to be. It's the same as the seldom-used *soft* tire.

These two different kinds of rubber—the dense, tough composition, to take the wear, and the soft, elastic rubber, to make you ride easy—are made into one solid piece by a special process. You can't skin the two kinds of rubber apart with a knife. Try it if you doubt.

The soft rubber portion is strengthened by having our *special fabric* vulcanized into it. This fabric is not the hard, inflexible sail cloth used in ordinary tires, but is woven like basket work, or an open-work stocking, and *gives* back and forth under pressure, and allows the elasticity of the rubber full play.

The dense rubber, the soft rubber and the special fabric together make a tire that's almost as durable as a *solid* tire, a tire difficult to puncture yet one which is as *resilient* as a man could reasonably ask.

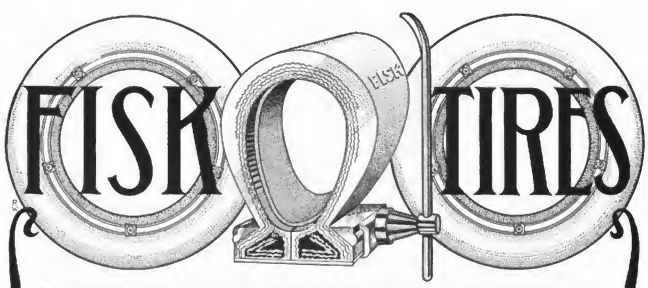
Our "Good News Book" tells more about the good points of this trouble-saving tire. You ought to get it now, for the Goodyear Detachable Auto Tire with Universal Rim will be "the only tire" next season.

THE GOODYEAR TIRE & RUBBER COMPANY, Mechanic St., Akron, Ohio

Branches in following cities: Boston, 8 Merrimac St.; New York, 250 West 67th St.; Chicago, 130 Lake St.; Cincinnati, 267 East Fifth St.; St. Louis, 1219 S. Broadway; Cleveland, 69 Frankfort St.; Philadelphia, 823 Spring St.; Denver, 520 Sixteenth St., and Detroit, 261 Jefferson Ave.

Bailey "Wont Slip" tread furnished on Goodyear Tires (all sizes) when ordered.

FISK CLINCHER TIRES



¶ Have withstood all competition as the Safest, Most Reliable, Long Wearing Tires made.

¶ They combine all the best features of other makes with many marked special virtues of their own.

¶ Their absolutely safe rim attachment is undisputably a veritable accident insurance. And they have a Quality peculiar to themselves, given by combining only the best materials with peculiar care in each one—as if our very reputation depended upon the service it rendered.

Write for article on Tire construction.

THE FISK RUBBER CO., Chicopee Falls, Mass.

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Swinehart TIRES

Without SWINEHART TIRES a Car is an Uncertain Means of Travel

We are equipping more pleasure cars with SWINEHART TIRES than ever before

85% of our tires are used on pleasure machines



They will give satisfactory results on any car, and any road

We have started suit against the Motz Clincher Tire & Rubber Co. for infringing our patents

The Swinehart Clincher Tire and Rubber Company

AKRON, OHIO, U. S. A.

BRANCHES

NEW YORK: 1843 Broadway CHICAGO: 1231 Michigan Ave. DETROIT 239 Jefferson Ave. BOSTON: 97 Haverhill

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MICHELIN

If the other fellow complains of bad tires, and you use Michelin, pass the word along.

THE FOUR MICHELIN PRODUCTS



10,000 Miles and then recover

We can make immediate deliveries all sizes. Write or call.

PHONE 5560 5561 MADISON

Michelin Products Selling Company, Inc.

EXCLUSIVE AMERICAN REPRESENTATIVE FOR

Michelin & Cie, Clermont-Ferrand, France

E. D. WINANS, GENERAL MANAGER 31-33 WEST 31st STREET, NEW YORK

PHILADELPHIA, J. L. Keir, Manager, 1434 Vine Street
BOSTON, G. Lamberty, Columbus Avenue
CHICAGO, D. J. Cameron, Michigan Avenue
NEW YORK BRANCH AUTO SUPPLY, 1662 Broadway

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"Firestone"

Pneumatic Tires

Have Caught the Popular Fancy

They were examined by thousands at the New York and Chicago Shows and invariably commended. The reasons underlying their approval by the most critical observers connected with the automobile trade are many.

In the first place, everyone who knows anything about tires knows that **Firestone** products represent the highest degree of excellence.

The **Firestone Pneumatic Tire** is built from the best of materials throughout in the most careful, painstaking manner. The easy accessibility of the inner tube, together with their absolute freedom from possibility of danger, make them ideal.

A **Firestone Pneumatic Tire** cannot possibly come off the rim no matter how severe the service. Were they not otherwise fastened, the flanges alone would hold them in place. We safeguard them, however, by the use of steel clips, securely fastened to the edges of the tire with large, smooth-headed rivets. Through these clips, the flanges and the felloe half-inch bolts are passed and firmly screwed in place.

A **Firestone Pneumatic Tire** might be fairly cut and torn into ribbons and yet it would remain firmly seated in the rim. There are no parts to work loose and permit the tire to fly off while running at speed, and the possibility of rim cutting in case of puncture is entirely eliminated.

The fact that eighty-five out of every hundred commercial automobiles are equipped with **Firestone Side Wire Solid Tires** is a guarantee of their superior excellence.

The **Firestone Pneumatic Tire** is just as good in every particular, and our mechanical fastening removes every objection heretofore existing in the use of **Pneumatic Tires.**

Booklet and further information will be furnished upon request.

Firestone Tire & Rubber Co., Akron, Ohio

Branches:

New York, 1788 Broadway
Boston, 9 Park Square
Philadelphia, 211 N. Broad St.
Chicago, 550 Wabash Ave.
St. Louis, 2226 Olive St.
Detroit, 240 Jefferson Ave.

"Firestone"

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Which Do You Prefer !!



Milwaukee, Wis., Jan. 2, 1906.
The Milwaukee Rubber Works Company,
Cudahy, Wis.

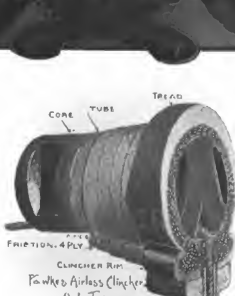
Gentlemen—I have driven the Fawkes Clincher Tires on my Model B Cadillac about 8,000 miles. They are the most satisfactory tires I have ever used, and I have used many, including ——, and —— Tires. They are resilient and ride quite like a pneumatic tire. With these tires *there are no troubles*, and from the appearance of the tires after 8,000 miles' use I believe they are good for as many more and perhaps two or three times as many more miles, and are the most economical as well as the most comfortable tires on the market. *They should not be compared with solid tires as they are in a class by themselves.*

Thanking you for calling my attention to a tire that would relieve me of the worries of automobiling, I beg to remain,

Yours truly,
(Signed) W. B HILL, M.D.

NOTE—Where the —— are above, there are in the original letter the names of four well-known pneumatic tires and one solid, but for obvious reasons we have omitted the names.

MILWAUKEE RUBBER WORKS CO.



Milwaukee, Wis., Jan. 2, 1906.
The Milwaukee Rubber Works Company,
Cudahy, Wis.

Gentlemen—I am a driver, and prior to last summer had all the trouble that was coming to me with pneumatic tires. My employer last season had a set of "Fawkes Clincher Tires" put on and then my troubles ceased and real pleasure began. I think they are superior in every way to a pneumatic; they ride as easy, last longer and, of course, do not puncture. That they were able to hold up a 1905 Winton, one of the heaviest cars built (5,500 lbs.), for 1,500 miles, over some of the worst roads in Wisconsin *without showing any signs of wear or flattening* convinced me that it was the best tire ever built for pleasure cars. I feel indebted to you for the amount of trouble they saved me.

Hoping that my next employer will use a set of your inestimable "Fawkes Tires" I remain a grateful chauffeur.

WM. HOBBS,
517 Cedar Street.

P. S.—Above tires have since Hobbs' experience covered an additional 1,063 miles by odometer, and one of the rear tires on the wheel was exhibited at the New York Auto Show, January 10-17, 1906, and also at Chicago Armory Show, February 3-10, 1906. They are still good as new.

Before making your decision let's get down to business and tell you what the Fawkes Airless Clincher Tire is and what it will do

1st—The Fawkes New Clincher 1906 Tire is the *best* automobile tire that has ever been manufactured.

2nd—The Fawkes New Clincher Tire is neither *solid* nor pneumatic, but has the *best qualities* of both and *none* of their defects. It rides as easy as pneumatic and lasts longer than any tire on earth.

3rd—The Fawkes New Clincher Tire will fit any standard G. & J. Clincher rim, can be put on by anyone without experience or special tools in ten minutes, and when once on cannot be torn off.

4th—The Fawkes New Clincher Tire is absolutely trouble proof. No pumping. No puncturing. Always ready for use. Makes automobiling thoroughly *safe* and enjoyable.

First, Last and Always—*The Fawkes New Clincher Tire rides as easy as pneumatic.*

The above statements are not based on *theory*, but upon the *severest practical tests.* NOW, WHICH DO YOU PREFER?

Dept. M. THE MILWAUKEE RUBBER WORKS CO., Cudahy, Wis. *Suburb of Milwaukee*

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THE HEALY LEATHER TIRE



SKIDDING!

SAVE YOURSELF FROM THIS DANGER

THE HEALY TIRE
POSITIVELY PREVENTS SKIDDING

HEALY LEATHER TIRE CO.

HEALY BUILDING

88-90 GOLD STREET, NEW YORK

PRICE LISTS AND DESCRIPTIVE CIRCULAR SENT ON APPLICATION

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Salisbury Tires

NO RUBBER BUT THE AIR TUBE. COMPOSED OF LEATHER AND FABRIC.

"The Trouble Proof Automobile Tire."

THE EXPENSE of maintaining an automobile is being gradually eliminated.

¶ Tire troubles positively cease when Salisbury Tires are used.

¶ *For people who are tired of tire trouble.*



¶ *For people who do not want tire trouble.*

¶ It is non-puncturable, and is absolutely water-proof.
¶ It will not burst under the use and abuse of motoring.
¶ It has the same size air chamber as any other pneumatic tire.
¶ It is as resilient as any rubber pneumatic tire.
¶ It is tough and strong and cannot be punctured.
¶ It will not stretch or get out of shape.
¶ It is made to fit any style rim.
¶ It is non-skidding.
¶ Mr. Automobile Owner, if the automobile agent in your city is not handling the Salisbury Tire, send us his name and address, and we will see that he is supplied.
¶ Agencies for the Salisbury Tire are now being booked, and we want to correspond with every automobile owner, agent, manufacturer and garage in the United States.
¶ Full descriptive matter sent on request.

SALISBURY TIRE CO.

180 Maine Street OWOSSO, MICH.

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Our 1905 Automatic Switch for Battery Charging



This has many improvements—iron, waterproof; wiring is accessible by taking cover, window over contacts. Cover removable by removing two screws, exposing all wiring. *Same Price as Heretofore.*

THE MARINE LAUNCH IGNITION & LIGHTING CO., Waltham, B. T.

STA-RITE
Spark Plugs

SURETY

Messrs. Clemens & Merz were sure of the four No. 4 Sta-Rite" Plugs which fired 850,000 charges in 24 hours—8,000,000 miles. You can always be just as sure of any of the 47 sizes of improved "Sta-Rites" (not types). Insist upon having "Sta-Rites" in your new car and save bother.



Garden Show Space No. 78.
Armory Show Space No. 61.
Coliseum Show Space No. 178.

The R. E. HARDY CO.
225 West Broadway, New York City

Do. 84, N. Y. 07-12

The Derracq car which made two miles in 58½ seconds was fitted with

Nieuport Magneto

ALBERT CHAMPION CO.
Sole U. S. Agent for Nieuport Magneto full Sport Plug.
541 Tremont St. BOSTON, MASS.



"Kent Pocket Meters"
DEAD BEAT
ACCURACY GUARANTEED
Volt Ammeters, 4-6 Volt, 0-30 Amp. Price, $9.00.
Voltmeters, 0-3 Volt. Price, $8.00.
Ammeters, 0-20 Amp. Price, $9.00.
Discount on Trade.
ATWATER KENT MFG. WORKS
1013 N. Sixth Street, Philadelphia, Pa.



The "SNAPIT" Lock Switch.
For Automobiles, Motor Boats and Launches. Thief, dust and water-proof. The key locks the cap, screwed and secures.
Send for Illustrated Booklet.
F. A. GOEBEL,
204 Front St., Marietta, Ohio,
or L. B. STEVENS, Gen'l Sales Agt., 38 Warren St., N. Y. City.



JUMP SPARK COILS
the very best, with ball bearing adjustment for all motor Automobiles, Launches and Stationary Engines.
THE INDUCTION COIL CO., Milwaukee, Wis.



A. R. MOSLER
163 W. 29th St.,
Bet. 6th & 7th Ave.
NEW YORK.

"SPIT-FIRE" PLUGS
actually SPIT FIRE, while others spark only. Ask your dealer or write us for New Booklet of 1906 Mosler Ignition Outfits



ROBERT VOLT AMMETER
For Testing Batteries
GUARANTEED
List price $6.00 incl. leather case | 0-Volt 20 Amperes ... 20 .. | Send for Catalog.
The Robert Instrument Co.
5 Shelby Street Detroit, Mich.

CONNECTICUT DASH COILS

CONNECTICUT DASH COILS are made up for one, two, four, and six cylinder motors, and all embody numerous improvements. With the coils one can secure from four to twenty times the mileage from a battery that can be obtained from the average coils now sold.

All units are interchangeable and can be removed without disconnecting a wire and without the use of tools. Simply throw the spring forward and lift them out.

Every coil will fire a piece of wood one inch square in 5 seconds so that it will burn freely, proving that it is the hottest spark produced from a jump spark coil.

The vibrator and contact screws are adjustable by means of heavy knurled thumb screws; simply turn them to left or right, and they "stay put," are self-locking; could not be more simple, and found only on Connecticut coils.

The eases are of selected mahogany, finely finished with a water drip around the bottom edge. A short circuit due to rain water is impossible with this construction, which is an exclusive Connecticut feature.

Few people realize why they can't keep batteries charged, or why dry cells cannot be used in their cars. The answer is simple because they are using inefficient coils for firing their motors. The makers of the Connecticut coil say that they have never found a case even in the highest compression motor where they could not fire the charge perfectly on ½ ampere of current, whereas the majority of coils now made cannot be adjusted to take less than 1 ampere of current and in some cases brought to their attention the current consumption was as high as 6 amperes. Hence they claim that they are perfectly justified in making the statement that the majority of coils take from 4 to 20 times as much current as their product. The amount of current consumed in a coil depends to a certain extent upon the adjustment. Connecticut coils are all adjusted to consume not over ½ ampere when running and cars have been run perfectly on 1/20 of an ampere.



TWO CYLINDER TYPE A DASH COIL, SHOWING ONE UNIT REMOVED.

NOTE the double spring connection, not depending upon one connection. Contacts can't shake loose or fail.



THE NEW EXCELSIOR
Self-Cleaning is the Leader of Jump Spark Plugs for '06, the only plug that cleans itself at most or all without removing it from the engine or disconnecting the wiring.
THE EXCELSIOR SPARK PLUG CO., Inc.
Write for Bulletin o Cleveland, Ohio

SPLITDORF SYSTEM

on all prominent machines using Jump Spark ignition at all the shows and only skilled labor produces these results.



Quality Counts
The old saying again proven true.
We manufacture Coils, High and Low Tension Magnetos, Commutators, Plugs, Switches, Cables, etc.

Are you among the "no ignition trouble" family? If interested drop us a line

C. F. SPLITDORF
17-27 Vandewater Street
NEW YORK, N. Y.

SPARK PLUG FALLACIES
Any Good Spark Plug will do
DANGEROUS ERROR!



Over three years ago we brought out the famous NEVER-MISS just because other Good Plugs did not maintain that high standard of efficiency demanded by the exacting motorists which is so essential to auto and motorboat satisfaction. NEVER-MISS won its way into popular favor at once. 100,000 sold in 1905. Our 1906 is by far the best plug on the market to-day. We can prove it. Our Coils, Battery Connectors, Chain Tools, Volt Ammeters and Terminals all merit their name and favor. Our 1906 Catalogue for the asking.

MICA, LAVA and Porcelain Plugs, any size, $1 50 Get a Set To-day

NEVER-MISS SPARK PLUG CO.
LANSING, MICHIGAN



INDUCTION SPARK COILS, BATTERY SWITCHES,
Timer and Ignition Dynamos
Write for descriptive matter and prices of our 1906 supplies.
SCHUG ELECTRIC MFG. CO.
84 Champlain St., Detroit, Mich



Protect Your Automobile by Using the
PARKER
LOCK-SWITCH
(The Only True Lock-Switch on the Market)
For particulars address
THE PARKER LOCK-SWITCH
Montclair, N. J.

PACKARD ENAMELED CABLES
like all "Packard Products"—are standard



They insure your ignition system against all leakage. Samples and prices?
The Packard Electric Company, Warren, Ohio. U. S. A.

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PITTSFIELD



Think a moment of the advantages of using the Ignition Goods manufactured by the Pittsfield Spark Coil Co.

Our 1906 Coil is a revelation, the most rapid, economical, reliable and durable coil made in the world (not excepting any). You cannot puncture or rupture it, as the insulation is so perfect that it is proof against these troubles.

Our 1906 Commutator or Timer is the strongest, most reliable and most perfect ever invented, a positive contact guaranteed under any condition.

Our 1906 Special Jewel Mica Spark Plug is perfection, no more fouling or short circuiting, the sparking points and chamber between the core and the shell being thoroughly cleaned at every explosion in the cylinder. Send for further information in regard to these goods before contracting for your 1906 requirements.

Pittsfield Spark Coil Co., PITTSFIELD, MASS.

"SOOT-PROOF" PLUG.



The most economical plug on the market, because it lasts so long.

The Spark Always Jumps.

No amount of Carbon can make it short circuit.

The porcelain is large, strong and non-absorbent, and cannot break under a temperature of 2500 degrees.

No knowledge needed for repairs. All parts interchangeable.

Beware of infringed imitations.

Write for free treatise telling how to correct and avoid electrical equipment troubles of gasoline motor cars.

It Was Real Merit

that made the "Soot-Proof" Spark Plugs win the McMurtry Medal in the Six Day National Economy Contest.

Ninety per cent. of all contests won in America were won by cars using "Soot-Proof" Plugs.

Specify them when ordering cars. It will save you trouble. Imitations? Sure, but that's flattery.

Indestructible, $2.00. Regular, $1.50.

Guaranteed:
YOUR JOBBER HAS THEM.



C. A. MEZGER, Inc., 203 W. 80th St., New York.

NATIONAL SALES CORPORATION
Factory Sales Managers. 256 Broadway, New York.

The Motor Car Equipment Co.

Manufacturers, Importers, Distributors

AUTOMOBILE ACCESSORIES

Manufacturers of the Famous
"CONTINENTAL"
AUTO LAMPS, CLOCKS
and
CALLIOPE HORNS



United States Agents for
The "BLANCHARD"
FRENCH HORNS

Sole Export Agents for
IMPERIAL WIXON PUMPS
"WEED"
CHAIN TIRE GRIP
"GEECEE"
DRY STORAGE BATTERY
"WEBER"
PORTABLE TURN-TABLES



Headquarters for CONTINENTAL TIRES "The World's Best"

SOUNDS LIKE AN ORGAN



THE CONTINENTAL CALLIOPE
55 WARREN ST., 1645-47 BROADWAY
NEW YORK

REMY MAGNETOS

Are used on more high grade American Motor cars than all other Magnetos and Dynamos combined.



Some of our customers

Pope Motor Car Co.
F. B. Stearns Co.
Knox Automobile Co.
Lozier Motor Co.
Electric Vehicle Co.
Matheson Motor Car Co.
Apperson Bros. Automobile Co.
Austin Automobile Co.
Mack Bros. Motor Car Co.

REMY ELECTRIC CO.
ANDERSON, IND.

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THE "AMERICAN"
STORAGE BATTERY FOR IGNITION
— MONITOR TYPE —



VOLTAGE—1 AND 2. CAPACITY—20 AMPERE-HOURS. PRICES—$6.00, $9.00, $12.00. OTHER STYLES—$4.50 to $80.00.

CATALOGUE ON REQUEST. ESTABLISHED 1888.

AMERICAN BATTERY COMPANY
161 SOUTH CLINTON ST., CHICAGO, ILL.

NATIONAL COILS



For 1906

Highest Possible Speed of Vibrators
Non-Sparking at Platinum Points
Insulations of Windings Absolutely Perfect

Write for full information regarding the radical features incorporated in our new line.

NATIONAL COIL COMPANY
LANSING, MICH., U. S. A.

Dry Paste
STORAGE Ignition Batteries
(PETO-CADEYT PATENTS)
RECHARGEABLE ON DIRECT OR ALTERNATING CURRENT
10% Higher Voltage. 20% Higher Capacity
UNSPILLABLE
ROOM 910 POSTAL TELEGRAPH BUILDING, NEW YORK CITY
Reliable Firms Desired as Special Agents

The battery of dry cells you use for ignition is apt not to receive much attention until at some critical moment it fails to do its work. Then you'll wish you hadn't been content with "any old battery."

The SPECIAL 1900 Rapid Fire cell solves satisfactorily the oft annoying ignition problem. And for this very simple reason—it is made *expressly for automobile ignition service*. It's bound to be better than ordinarily made batteries.

Send for our dry battery book.

The Nungesser Electric Battery Company,
CLEVELAND, OHIO, U. S. A.
GENERAL SALES OFFICE
128 West Jackson Boulevard, Chicago, Ill.

Bar Boy's Friend
The Best Automobile Metal Polish on Earth

Removes stains from brass, copper, and all metals instantly without injuring the surface and leaves a fine lustre. Sample package sent, postpaid, for twenty-five cents. Liberal discount to dealers and agents.

Gramlich Chemical Co.
170 Leaverett Street DETROIT, MICH.

KINGSTON 1906 Carburetor and Coils





Our various catalogs, describing in detail our products, will be sent on request.

BYRNE, KINGSTON & CO.
120 SMITH STREET KOKOMO, IND.

General Electric Company
TO CHARGE YOUR BATTERIES

The best device is the General Electric Mercury Arc Rectifier, which changes the alternating current of the ordinary lighting circuit to direct current of proper voltage.

Both the price and the cost of operation are low. It requires little floor space, only about 18x24 inches, and is the simplest charging outfit produced. It can be installed in your barn, and run by any employe of ordinary intelligence.

The rectifier will operate on a wide range of voltage and can be adapted to any commercial frequency. It is absolutely reliable in its operation.

A complete switchboard is supplied with every rectifier and the whole outfit has a very neat appearance.

There are also supplied special panels of extra capacity for garage charging, and special outfits for charging sparking batteries of gasoline machines.

The rectifier is being extensively used and is heartily endorsed by the purchasers.

New York Office: 44 Broad Street
PRINCIPAL OFFICE: SCHENECTADY, N. Y.
Sales Offices in all large cities



1906 MODEL, No. 84.

WE ARE
Headquarters for Coils
Cylindrical or Encased
of all sizes and for all purposes
SPARK PLUGS, AMMETERS, VOLTMETERS
GOODS RIGHT. PRICES RIGHT.
Send for Catalog.
DOW PORTABLE ELECTRIC CO.
Washington St., Bridgeton, Mass.

L. H. & H. O. Bill, 203 McAllister St., San Francisco, Cal.
Fogarty Bros., 118 St. James St., Montreal, Canada.
Member of the N. A. A. M.

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26% INCREASE IN POWER
on ⅓ the BATTERY

By the use of a

Connecticut Spark Coil

Think of it! We don't agree to do this in every case but are so sure that we can improve over the results you are now obtaining that we will take all the chances.

If you are having trouble with your coil or are unable to keep batteries in working condition in your car, write for full particulars regarding our

SPECIAL TRIAL OFFER

Remember Connecticut Coils hold the **World's Records** for **Endurance and Economy**, and are the Best Coils made either in this country or abroad. Built on Honor. Send for Catalog No. 12, "M."

THE CONNECTICUT TEL. & ELEC. CO., Inc.

100 BRITANNIA ST., **MERIDEN, CONN.**

The National Sales Corp., Sales Mgrs., 256 Broadway, New York

We shall exhibit at the Boston Automobile and Power Boat Show. Space 138

HEINZE MOTOR CAR COILS



Specify Heinze Coils on your Car

BECAUSE

Heinze coils will make your engine run faster.
Consume less battery current.
Each coil section can be removed without disconnecting low and high potential wires.
Trembler has a wide range of adjustment and is positive in its action.
Coils are guaranteed against a burn-out or breakdown even when using many more batteries than are commonly used.
Electrical and mechanical workmanship and finish are of the very best that experienced men and machinery can accomplish.
Our years of experience in the manufacture of coils enable us to make this very superior automobile spark coil and we guarantee it in every respect.
We make everything in the coil line from 1 to 6-cylinder coils, single coils with high potential distributor for two or four cylinders, dash board coils, plain vibrating box coils and make-and-break coils.



You will make a wise move in specifying Heinze Coils and you will never be disappointed

Send for Catalogue **HEINZE ELECTRIC COMPANY** **Lowell, Mass.**

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Witherbee Storage Battery Igniter

Now Used and Endorsed by 48 of the Leading Automobile and Motor Boat Manufacturers.

Can you afford to consider anything else for your '06 Car?

"Every Battery Guaranteed, every Customer Satisfied." Over 12,000 Batteries now in use. Suitable for any Gas or Gasoline Engine using Make and Break or Jump Spark Ignition.



Recognised as the Most Satisfactory Means of Ignition.

Every Battery Guaranteed to give Satisfaction or Purchase Money Refunded.

When ordering your Car insist on having the WITHERBEE and avoid all ignition troubles.

Endorsed by the Leading Manufacturers. Sold by the Leading Jobbers.

Write for Descriptive Pamphlet.

WITHERBEE IGNITER CO., 541-543 West 43d St., New York

THE "Exide" BATTERY for Electric Vehicles

Renewals for Exide Vehicle Batteries furnished upon a special basis

WRITE FOR DETAILS

THE ELECTRIC STORAGE BATTERY CO. PHILADELPHIA, PA.

SALES OFFICES: New York Boston Chicago St. Louis Cleveland San Francisco Toronto, Canada Mexico City

"National Batteries" for ELECTRIC VEHICLES

NEW YORK CITY BATTERY DEPOT: SMITH & MABLEY, Inc. 57th St. & Broadway

RELIABLE

National Battery Company

ELECTRIC STORAGE BATTERIES

BUFFALO, N. Y.

"National Sparkers" for GAS MOTORS

BRANCH OFFICES: NEW YORK CHICAGO



TRITT DASH COILS

Are superior to ALL other Coils because they are made on the **Unit Plan**

Having all connections made without binding posts nuts or screws They have the **swiftest vibrator** ever made (We except none.) Every unit is absolutely

Interchangeable and Automatic

In a recent test by a large automobile company, it was a TRITT coil that set the pace for all others.

THE TRITT ELECTRIC CO., Union City, Ind.

BELDEN TRANSMISSIONS

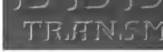
BELDEN AUTOMOBILE TRANSMISSION CO.
Bessemer Building
PITTSBURG, PA.

WRITE FOR BOOKLET M



Rear Axle Transmission Complete with Cover Removed

1906



Price, $1.50

AMERICAN INDESTRUCTIBLE SPARK PLUG

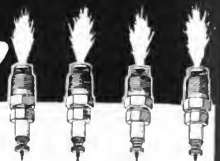
Double insulated mica core. Soot proof. Indestructible. Lasts indefinitely. Equip your car with a set of these plugs and save further trouble and expense. We manufacture a full line of high grade Coils, Plugs, Timers, Ammeters, Switches, etc. Write for Catalog.

American Coil Company, Foxboro, Mass.

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The APPLE for 1906 Ignition System



THE COMPLETE APPLE IGNITION SYSTEM FOR 1906 consists of the Apple Storage Battery Charger, the Apple Storage Battery, the Apple Automatic Cut-Out with all the necessary coils, plugs and timers.

It affords a complete charging plant right on your car which *will furnish an abundant current supply.* This affords strong *hot* spark that will explode an entire charge at an instant and get all possible power out of every charge.



Storage Battery

The Apple Portable Storage Battery

Sparks from Storage Battery current give off *heat*—it is heat that explodes the gas.

They explode an *entire charge at an instant*—that is what gets all the possible power out of every charge. And on account of the *enormous flow* of Storage Battery current it is the best current for operating electrical devices for ignition work.

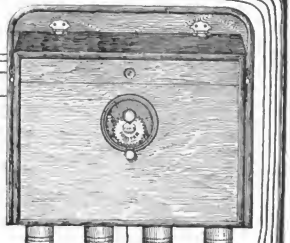
The Apple Storage Battery is built for portable use. It is made up of lead bottle units, absolutely non-breakable. Will stand the jolt, the jar and the weather. It can be charged by any direct current, but we recommend the Apple Battery Charger (described in this ad) for charging right on your car.

The Apple Automatic Cut-Out and Volt-Meter

When the engine is not running it automatically cuts out the dynamo from the storage battery so that the battery current will not run back through the dynamo. The voltmeter indicates the voltage of the batteries.



Timer



Coils



Automatic Cut Out

The Apple Battery Charger

It charges the battery right on your car and keeps the battery voltage strong and constant. No danger of over-charging or discharging too low. It charges the battery *all the time* that the battery is giving off current—thus it can charge at a low rate and keep the battery in the pink of condition. It is the best dynamo made in the world, irrespective of size or use for which intended. Uses electromagnets electrically formed by a current generated by the machine itself. No so-called permanent magnets, affected by vibration and heat, as found in magnetos.



Battery Charger

This is the latest and best ignition system on the market

Specify an Apple outfit on your Car

Increased satisfaction and saving on battery renewals will more than pay for the additional investment

Write today for full information about our system

The Dayton Electrical Mfg. Co. 169 St. Clair Street Dayton, Ohio

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KILGORE AUTO. AIR CUSHION "SHOCK ELIMINATOR"

Patent Allowed



THE ONLY DEVICE which equalizes the load on the springs under all conditions. Which controls properly the spring play in both directions, but does not deaden the natural spring elasticity. You Ride on Air. A Perfect Protection to car and passengers. Send for circulars and testimonials.

For Sale by the Automobile Trade Generally

SOLE MANUFACTURERS

KILGORE AUTO. AIR CUSHION CO.

47 Columbus Avenue, Boston, Mass.



The Motorist whose car is equipped with the

WEED CHAIN TIRE GRIP

doesn't care a snap about snow or ice or mud or sand, or steepest hills. Safe, easy travel under all circumstances are assured to users of this ingenious device. Easily applied; requires but little car room; and the cost very moderate considering the great advantage.

"As necessary as pneu-ics"

Weed Chain Tire Grip Co.

Office and Warehouse:

28 Moore St., New York



Even a boy

can lift a 6000 lb. car with a

"U. S." JACK

THE NEW HEAD fits the truss brace—square or round axle. Side motion to lever. Compact, strong, doesn't rattle, cannot drop. No. 1 10K inches high; weighs 5 ¾ lb

Price to introduce $2.25

THE "U. S. JACK CO.

38 S. Clarement Ave., Chicago, Ill.

THE *Loring* SPEED-GAUGE JAR PROOF



Most compact and most complete Stop-Hand, Trip Odometer. Easily read. Shows miles per hour minutes per mile and distance for season to 10,000 miles and repeat. Hand absolutely steady under severest vibrations and may be locked at any time for evidence. Flexible shaft shortest and most direct. Complete attaching fixtures, readily applied.

LOOK FOR US AT THE BOSTON SHOW

Circular upon Request

E. J. LORING, Somerville, Mass.

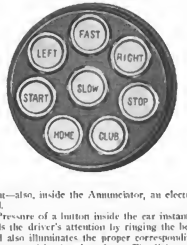
JONES ANNUNCIATOR.

THE motor-car annunciator is a signalling device for communicating with the driver from the interior of motor-cars. Although in vogue abroad for some time it has been lately introduced and perfected in America by Joseph W. Jones, inventor of the Jones Speedometer. It is designed primarily



for use in the enclosed part of limousines and, touring cars, affording the facility of giving commands without the use of a speaking tube, and without distracting the driver's attention from the road ahead.

The Jones Annunciator is made in two parts, one a circular disk 3 inches in diameter, placed conveniently in the main body of the car and having a set of eight push buttons, handsomely engraved with the following signals: Start, Stop, Fast, Left, Right, Home, Club. Another disk for the dashboard is in size and shape precisely the same as the 50-mile Speedometer-Odometer for which the Annunciator is designed as a companion piece. The corresponding series of commands are shown on the glass front in white letters against a black background and under each word in its own separate compartment is a miniature electric



light—also, inside the Annunciator, an electric bell.

Pressure of a button inside the car instantly calls the driver's attention by ringing the bell, and also illuminates the proper corresponding signal word in the glass face. The lights are powerful enough to make the signals plain and unmistakable in daylight as well as at night

ALUMINUM MUD GUARDS.—Sheet aluminum mud guards over the front wheels should be strongly braced at their front ends. Not only are they certain to be used as elbow rests a dozen times a day, but if the brackets supporting these front ends becomes at all loose, or if the bolts holding the mud guard to the bracket loosen in the slightest, the front end will set up a vibration which will break it in a short time. If for any reason difficulty should be found in keeping the mud guard bolts perfectly tight it will be policy to reinforce the guard by stiffeners under its edges to prevent it from flapping, without waiting for the inevitable break to appear.



"LONG NEEDED ARTICLE"

Index Funnel

"Save When"

For Automobiles Copper: $2.00

Motor Boats Galvanized Iron: $2.50

Large Size - - - - $3.00

The only Funnel in the world that tells when tank is filled. Has splash guard and sleeve, removes danger from overflow. For sale by all first-class dealers.

See the Indicator.

W. T. TALIAFERRO

Owner and Patentee 256 Broadway, New York

IF YOUR DEALER HAS NONE IN STOCK ORDER DIRECT



LAMPS

$5.00 $6.00 $8.00

$10.00 $12.00 $15.00

Send 5 cents for Catalogue

Newark Merchandise Co.

12 CANAL ST. NEWARK, O.

Baldwin Spring Recoil Checks

Make fast riding comfortable. Send for circular

Baldwin Chain and Mfg. Co.

38 Hermon Street Worcester, Mass.

BOSTON CYCLE AND SUNDRY CO.

The Automobile Supply House of New England

Do you need For Coats, Robes or Gloves?

INVESTIGATE OUR PRICES SAVE MONEY.

48 HANOVER ST., BOSTON, MASS.



"Nulcon in Parve" Auto Lit
Formerly sold for 25c. a lb

John Boyle & Co.

Manufacturers of

Leather Hampers and Automobile Basket

License Numbers

112-114 Duane St.

70-72 Reade St.

NEW YORK

THE BURKE HILL CLIMBER

A positive preventive against skidding for Automobiles and Commercial Trucks. Is efficient in Sand, Mud, Snow and Ice.



Our Chain Repair Tool is the Best on the Market

J. C. BROWN MFG. CO.

BUTLER, IND.

THE SOLVAY PROCESS COMPANY'S "KAL-KRYSTAL"

MAKES THE BEST NON-FREEZING SOLUTION FOR AUTOMOBILE USE

Neutral and non-corrosive. Stands 50 degrees below zero. Take Put up in sprinkled cans. Makes a gallon of solution ready for use For sale by all Automobile Supply Houses.

CARBONDALE CHEMICAL CO., Carbondale, Pa.



Standard Automobile Jacks

can be depended on at all times to perform the work required of them.

COOK'S RAILWAY APPLIANCE COMPANY

Manufacturers exclusively for

BEDELL-STEVENS MFG. CO. KALAMAZOO, MICH.

(No change in ownership or management.)



Auto Screw Jack

Powerful Ratchet Double-Acting Screw Jack

Easy to Operate Quickly Adjusted

No.	Weight Each	Lifting Capacity	Adjustment
501	6 lbs.	3,000 lbs.	11 to 17 in
502	8 lbs.	4,000 lbs.	13 to 19 in
503	12 lbs.	6,000 lbs.	14¾ to 23¾ in.

COVERT MFG. CO., Troy, N. Y.

SPECIFY E. & J. LAMPS

[illegible] your automobile, and you will get [illegible] artistic, up-to-date and reliable lamps [illegible] E. & J. lamps cost a little more, but [illegible] worth. We do not hesitate to include them [illegible] specified to make when the auto [illegible] Our catalogue, illustrating and [illegible] complete line, will be sent to any address upon request.

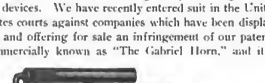
EDELMAN & JONES MFG. CO., 111 Riopelle Street, Detroit, Mich.

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WARNING

The Gabriel Horn is fully protected by patents, and dealers and users are warned against purchasing infringing devices. We have recently entered suit in the United States courts against companies which have been displaying and offering for sale an infringement of our patents, commercially known as "The Gabriel Horn," and it is



needless to say that we will continue this policy of protecting ourselves and our customers from infringers. When purchasing, be sure the horn bears our Trade Mark.

TRADE MARK.

GABRIEL

The Gabriel Horn warns without frightening and has a beautifully modulated chime.

Manufactured in 2, 3, 4 and 8 chimes.

GABRIEL HORN MFG. CO.

975 Hamilton Street, Cleveland, O.



BEST WITHOUT COSTING MOST

HICKS SPEED INDICATOR AND ODOMETER

50 Mile Indicator and Odometer	$50.00
100 Mile Indicator and Odometer	$75.00
Odometer	$25.00

GUARANTEE.—We will guarantee the Hicks Speed Indicator for accuracy, workmanship and material for one year. All instruments are sealed when they leave the factory, and when returned in that condition because of any defect within one year of purchase, we will replace same with new indicator.

WRITE FOR BOOKLET AND AGENCY PROPOSITION

HICKS SPEED INDICATOR CO.

1386 BEDFORD AVENUE, BROOKLYN, N. Y.

Progressive and Up-to-date Automobilists

Protect themselves from jars and their Springs from breakage by using

FOSTER SHOCK-BRAKES

They are a new and unique device for relieving the strain on the Springs of Automobiles, regardless of any bump or sudden shock which the wheels may encounter.



They are a small, light cylinder, made of cold drawn steel, with piston or plunger which is attached to the frame and which operates as follows: The lower portion of the cylinder contains oil. The sudden compression of the spring forces the plunger down against the oil, and the plunger head is so constructed that when it comes in contact with the oil in the lower part of the cylinder, it forces it through 8 small holes in the valve disc into the upper chamber, then when the recoil occurs, the oil acts as a cushion and the plunger returns with a slow, steady pull, which prevents the jar and shock always occasioned by a sudden bump. The oil flows back into the lower chamber, a small portion at a time and thus relieves all strain and jar from the spring as well as eliminating all possibility of a broken spring.

The FOSTER BRAKE is economical, simple, compact, substantial, weighing 2½ lbs., adjustable in every direction and can be placed on any machine.

Set of 2, $15.00 **Set of 4, $30.00**

Manufactured by

GABRIEL HORN MFG. CO.

975 Hamilton Street, Cleveland, Ohio



Absolutely Accurate
At All SPEEDS

AN accurate speed and distance indicator is quite as necessary on your *Automobile* as a watch is in your *pocket*.

Furthermore it must be *absolutely dependable* under all conditions of heat, cold or position. Otherwise a speed indicator is not worth the space it occupies.

Isn't that so?

You can always depend on

The Warner Auto-Meter

whether you go slow or fast, whether the road is rough or smooth, hilly or flat.

It's the only indicator which is *always that way*.

It's the only indicator which gives correct readings in *any position*, no matter what the angle of your car.

It's the only indicator you can *read* with certainty because the dial changes with the *speed alone*, and is unaffected by the jar of the car.

The Warner Auto-Meter has all these qualities and good points—because it is the *only* speed indicator which is actuated by the same *Tested and Changeable Magnetism* which makes the Mariner's Compass reliable and dependable FOREVER under all conditions.

No one else can successfully use magnetism to determine the speed of an Automobile, though it's the only *positive* and *sure* way, because there is only just *one way* that magnetism can successfully be used for this purpose and *we have patented that way*.

The Warner Auto-Meter will last a lifetime. It's as sensitive as a compass and as *solid as a rock*. It will withstand any shock that your *car* will stand without the *slightest degree* and without affecting its *accuracy* in the slightest degree.

That's why we can sell the Auto-Meter on a

10 Years Guarantee

and will gladly renew any Auto-Meter (which has not been injured by accident) if the Magnet (the HEART of the instrument) is more than *1/2 of 1 per cent* incorrect *after 10 years use*.

We will gladly tell you more about this wonderful instrument if you will write us, and at the same time will send you something very much worth while.

Free Book "Auto Pointers" Write for particulars. TODAY—don't put it off.

THE WARNER INSTRUMENT CO.

118 Roosevelt Street, BELOIT, WISCONSIN

The Auto-Meter is on sale by all first class dealers and at most Garages.

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CANDY CARBIDE
Per FRENCH AUTO LAMPS (Lampes pour la voiture)
Packed only in 10 lb. cans. Price $2 each.
Discount to dealers in case lot of 10 cans.
SOLE MANUFACTURERS
ACETYLENE GAS ILLUMINATING CO.
108 WALKER STREET NEW YORK

HIGH-GRADE LAMPS
Acetylene Gas and Oil
ATWOOD MFG. CO
Amesbury, Mass.

FOR TWENTY DOLLARS
I guarantee freedom from dust in Automobile Riding. Booklet to inquirers.
W. H. BROWN
205 Lenox Building, Cleveland, Ohio

"Tourist" Autokit—
is made up of 36 of the very best selected tools obtainable, and is the highest type of repairing outfit for road use. The "Tourist" is especially arranged with reference to its quality and utility, and embodies every possible permanent and emergency value that can be included in a kit of this size.
Send for special circular No. 1783
Hammacher, Schlemmer & Co.
Fourth Ave and 13th St. New York Since 1848

LET US ACT AS YOUR FACTORY
That is our business We make anything mechanical in any metal Particulars mailed on request.
KALAMAZOO NOVELTY WORKS
12 ROSE STREET KALAMAZOO, MICH.



OUR Springs are made of the best high Carbon Steel Spring Wire. We have a Special Designer to figure out special constructions for special cases. Let us figure with you on anything you need in the spring line. Our springwork is covered by eight U. S. patents, and others pending.
JACKSON CUSHION SPRING CO., Jackson, Mich.

GASOLENE AND NAPHTHA
Storage Tanks
Of All Sizes and Dimensions
L. O. KOVEN & BROTHER, Mfrs.
30 CLIFF STREET, NEW YORK
MANUFACTURERS of HIGH GRADE
Automobile Radiators, Etc.
THE MAYO RADIATOR CO.
NEW HAVEN, CONN.

THE P. T. C. POWER TIRE PUMP
Get one of these pumps and end your pump troubles. Always in place and operated by turning a screw. Write for Circular B.
THE PACIFIC TUCKING & MFG. CO.
471 (8th Street, BROOKLYN, N. Y.



Stickney Safety Steam Generators
Can be run by gasoline, kerosene, alcohol and kerosene.
Perfect safety and absolute certainty guaranteed. No pilot chimney to heat and burn out.
PORTLAND GARAGE
Portland Maine

NOT A MIXTURE—A POLISH
"GLOBE" METAL POLISH
Does Not Rub Off or Fade Away the Metal.
Imparts a Lasting, Brilliant Lustre to any Metal.
No Washing, Grinding or Polishing
SOLD EVERYWHERE

LIPMAN ELECTRIC SPEED INDICATOR

THE Lipman Speed Indicator, made by Carl E. Lipman, Beloit, Wis., consists of an electric generator which produces an electric current, the strength of which is proportionate to the speed. A very sensitive volt meter measures the current produced by the generator and indicates on a scale calibrated to read miles per hour instead of volts. The volt meter used is so sensitive that less than one volt is required for a full deflection of the needle. The electric generator used is very small and compact and weighs but little more than one pound. It requires no attention whatever except for oiling the bearings twice each season. The generator is mounted on the steering knuckle and driven through gearing by one of the front wheels. The entire generator is fitted into a dust-proof case. The shaft is made of steel, hardened and ground, and runs in ball bearings. A heavy insulated flexible wire cable conveys the current from the generator to the indicator on the dashboard. The dashboard bracket is adjustable, permitting the instrument to be set at any angle desired.

The instrument and generator case includ-



THE LIPMAN ELECTRIC SPEED INDICATOR WITH SEASON AND TRIP ODOMETER AND VOLT AND AMPERE SCALES

ing all fixtures, are made of brass, highly polished.

The Combination Season and Trip Odometer, which records the exact distance, whether the car is moving forward or backward, is operated by a flexible shaft which makes only ten revolutions to the mile. This great reduction in the speed of the flexible shaft is secured by the use of worm gearing mounted in the generator case. The flexible shaft has nothing whatever to do in connection with the Speed Indicator. The right hand figure in both season and trip dials is printed in red and indicates tenths of miles. The season dial records up to ten thousand miles and repeats, while the trip dial records up to one hundred miles. The method for setting the trip dial back to zero is absolutely fool-proof. It is only necessary to give the knurled button

Central Park Automobile Storage Co.
110th Street and Central Park West
STORAGE, SUPPLIES
:: :: REPAIRS :: ::
ELECTRICS CHARGED
Capacity for 125 Cars
LARGEST GROUND FLOOR SPACE IN NEW YORK

PARDEE-ULLMANN CO.
DEALERS IN HIGH GRADE
MOTOR CARS
1218-20 Michigan Ave., Chicago
PHONE, SOUTH 597
PACKARD FRANKLIN



Established 1873. Gape Lathes. Turret Engine Lathes and Shapers; Screw Cutting Foot and Power Lathes. Hand and Power Planers. Hand and Power Drills. Chucks, Emery Wheels, Outfits. Tools especially for Blacksmiths', Electricians' and Bicycle work. Catalogues free.
SHEPARD LATHE CO.
141 W. 2d Street, Cincinnati, Ohio



What is the "Speedistimeter"
A combination speed recorder, total odometer, trip odometer and 8-day Chelsea Auto Clock
TELLS SPEED, DISTANCE AND TIME OF DAY
Enclosed in handsome waterproof brass case and connected to wheel by flexible shaft. Easily attached to any car and guaranteed as to accuracy.
Write for booklet. If not a proposition to satisfy
WILLIAM S. JONES, 112 N. Broad St., Philadelphia

The "SPRINGFIELD" TIRE TOOL



For removing any Clincher Tire from 28 to 48 inches. Impossible to injure the Tire. Weight, 1½ pounds. Price, $7.00 delivered. When ordering, give size of Tire
THE SHAW PER CO.
SPRINGFIELD, O.



DID YOU EVER
attempt to take off a clincher tire without proper tools?
¶ The "Uneedme" Tools are made especially for removing and putting on tires.
¶ Nickel plated, $2.50 per set.
¶ Our booklet tells all about them.
"UNEEDME" TOOL CO.
72 E. SPRING ST., COLUMBUS, OHIO

WILSON AUTO CLOCK
Only Auto Clock that
Tells the Time at Night
Water-Proof, Dust-Proof, Thief-Proof
Wilson Auto Clock Co., Inc.
937 Arch St., Phila. Pa.

NEW TIRE CASE



Quickest to adjust, easiest to put on, cheapest to use. Will fit any size tire.
We furnish the common style with lace fastening if desired.
Lamp and auto covers, tool rolls, leggings and other auto fabric supplies.
Manufactured exclusively by
The WM. H. WILEY & SON CO.
Box 81, Hartford, Conn.

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The Auto Supply Co. INC.
1662 BROADWAY, N.Y.

EVERYTHING for the
OWNER,
CHAUFFEUR
and the AUTO.

We are not offering experiments or something "just as good" for a little less, but are selling the very best only, as reasonable as possible.

Our stock consists of the most complete line of up-to-date SUPPLIES, AUTO APPAREL and TOOLS, and if anything bought from us is not entirely satisfactory or exactly as represented, we will refund the purchase price.

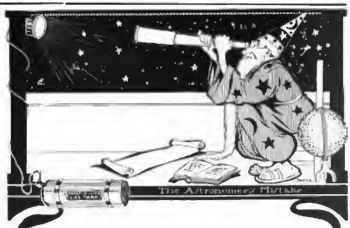
Our Sixth Annual Catalogue, containing numerous articles of interest to all users of automobiles, is in the hands of the printer, and we shall be pleased to place your name on our mailing list.

We maintain no branch houses.

Our only place of business is

1662 BROADWAY, NEW YORK

The Auto Supply Co. INC.
1662 BROADWAY, N.Y.



A Mistake

which the average purchaser of an Automobile makes as that of having his car equipped with carbide gene rators before he has looked into the merits of the *Prest-O-Lite Gas Tank*.

Automobile manufacturers include carbide generators in the equipment of the machine, but if you insist upon having a *Prest-O-Lite Gas Tank* placed on the machine before you "plank down" your hard-earned cash, they will very gladly include a *Prest-O-Lite Gas Tank* in the equipment. "It is up to you," Mr. Automobile Buyer, whether or not your machine is equipped to make your night riding safe and provide against accident.

The *Prest-O-Lite* is pure, clean, safe and convenient. There is no foul smelling carbide to handle and soil your clothes and ruin your lamps. There is no water to freeze up and burst your generators and cause an additional expense simply turn on the gas and light it.

Empty tanks can be exchanged for a full one at a small cost—dealers in every part of the United States.

Prest-O-Lite Gas Tanks are made in two sizes. Size "A," capacity seventy cubic feet, $30. Size "B," capacity forty cubic feet, $25.

PREST-O-LITE CO.
330 N. Illinois Street Indianapolis, Ind.

Exclusive licensees under patents of the Commercial Acetylene Company, New York.

BARRETT JACKS

BARRETT'S PATENTS

are the only jacks on the market that may be operated conveniently without interference from the body of the car. The improved 1906 designs raise the car on the *downward* movement of the lever *only*—the upward stroke being perfectly free.



They are the only substantial and high grade jacks on the market that may be safely and continuously applied to medium or heavy weight cars.

Adopted by every leading manufacturer and operator and carried in stock by leading dealers.

Send for Catalog "O-M," 1906

Manufactured only by

The Duff Mfg. Co.

PITTSBURG, PA.

Works: ALLEGHENY, PA.

Established 1883

New York Paris Montreal Moscow London

—this coupon brings you a valuable book

You'll learn something about Auto fuel you never thought possible.

You'll learn how to move your Auto FASTER—at less expense—and with less inconvenience than you NOW have, using gasoline.

Please send me your book AUTO FUEL FACTS and full particulars of ENERGINE without obligation on my part

The ENERGINE Co.
1899 Cuyahoga Bldg
Cleveland.

Name _____

Street No. _____

City & State _____

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1899

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DIEZEMANN



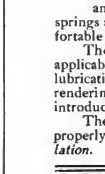
SHOCK ABSORBER

ATTACHED to your automobile the DIEZEMANN SHOCK ABSORBER positively removes all shock and vibration. It prolongs the life of the engine, springs and tires and insures a uniform action and comfortable driving over rough roads.

The construction of the apparatus renders it readily applicable to the inside or outside of the frame. It is self-lubricating and is absolutely dirt and air-tight, thus rendering the greased friction services proof against the introduction of all foreign substances.

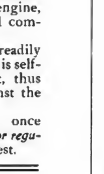
The Diezemann Shock Absorber when once properly adjusted requires *no further adjustment or regulation.* Booklet and testimonials free upon request.

DIEZEMANN SHOCK ABSORBER COMPANY
1315 HUDSON STREET, :: HOBOKEN, NEW JERSEY
"RIDE ROUGH ROADS RIGHT"

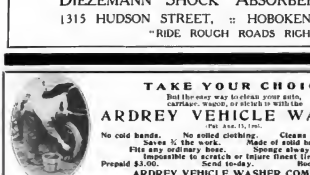


THE OLD WAY

TAKE YOUR CHOICE
But the easy way to clean your auto, carriage, wagon, or sticks to with the
ARDREY VEHICLE WASHER
Pat. Aug. 15, 1905.
No cold hands. No soiled clothing. Cleans in ¼ the time.
Saves ½ the work. Made of solid brass
Fits any ordinary hose. Sponge always clean.
Impossible to scratch or injure finest finish.
Prepaid $3.00. Send to-day. Booklet FREE.
ARDREY VEHICLE WASHER COMPANY
137B Main Street Rochester, N. Y.



THE ARDREY WAY



Overhead
Vehicle Washer
Illuminated or Plain
Only Illuminated Washer Made
Where are mythic auto- is its praise. Allows of washing at night or in dark place, throwing the water on to the wheels, carriage, etc.
A Necessity in all Garages, Club and Private Auto Stations. For Sale by all Dealers
Send for Descriptive Catalog and prices
B. N. B. MILLER, 2228 N. Street
General Western Agent, Sacramento, Cal.
Vehicle Specialty Company
HARTFORD, CONN., U. S. A.



The Favorite
Price $25

For Garages or Private Stables
For Livery and Boarding Stables.
Save Time, Labor, Money.
Abundant Testimonials

OVERHEAD
CARRIAGE WASHING MACHINES
Quicker and Better

THE H. NICHOLSBURG MFG. CO.
68 DEY STREET
NEW YORK

The Utility



Price $30

For advertisements received too late for classification see the last five advertising pages.

on the right a few turns—you cannot turn the button in the wrong direction and damage the Odometer.

A volt and ampere scale, located on the face of the indicator dial, printed in red, is provided for battery testing, reading up to six volts and thirty amperes. A flexible cord is furnished with each instrument for making connection from battery to volt and ammeter. The terminals are on the back of the case

Very often the passengers in the rear seats would like to know how fast they are going, as well as the driver. With the Lipman Speed Indicator an extra instrument for the body may be secured at a comparatively small cost. This instrument is connected with the same generator which operates the dashboard instrument. If you want a speed indicator in the body part at a nominal cost you will have to buy the Lipman Speed Indicator, because it is the only one on the market which permits of one or more dials being operated from a single wheel connection and without the use of long flexible shafts, running at high speeds, which alone are prohibitive.

FOUR WHEEL DRIVE TRUCK.

(Continued from page 57.)

stud shaft which is received into a square hole in the driving plate of the wheels. This plate is doweled and bolted to the outside of the hub.

The brakes are of the internal expanding type, drums for which are cast integral with hub, thus relieving the universal joints of all strains consequent upon stopping the truck suddenly. The most important feature of the brake is, in case of breaking of any part of the driving shaft or propeller shaft in ascending a grade, the application of the brake direct to drums on the wheel precludes all possibility of running backward down hill. This system of applying a brake to a wheel which steers and drives both is original.

The motor is of a standard design, mounted on a three point suspension sub-frame. It is especially adapted for heavy service and amply powerful for any emergency. The four cylinders are cast separately with integral water jackets and are carefully machined and ground. Circulation is by gear pump driven by crank shaft. Ignition is by Remy magneto and jump-spark system.

Circulating water is cooled by a radiator, and two fans driven by belt to crank shaft. The cam shaft and valve gear are easily accessible by hand holes. The bearings are all extra long and bronze bushed.

Inlet and exhaust valves are interchangeable, mechanically operated, and on the same sides of cylinders. The transmission gear, of a standard sliding gear type, giving three forward speeds and reverse, is mounted on the motor sub-frame. A universal joint connects the primary shaft to the crank shaft of the motor. By this suspension perfect alignment is maintained in the change-speed gearing at all times, irrespective of the spring or twist which the truck frame may undergo.

The frame is of cold rolled ship channel steel with the flanges outward. It is bent in one piece and braced at the four corners, insuring the necessary amount of stiffness at the angles, but allowing of flexibility between front and rear ends. Stiffness amidships is secured by low-sitting trussing on each side of the frame.



AUSTIN CHECK.

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The Powerful Searchlights and Headlights

Material and Workmanship of the HIGHEST GRADE

Catalogue on request

Peter Gray & Sons

Manufacturers

88-90 Union St., Boston



Columbia Lens Mirror Lamps A, B, C, D



Columbia Generator No. 2 B. 24 Ounce Capacity.

Columbia Generator, No. 2 B. 24 Ounces Carbide
Columbia Lens Mirror Lamps, A, B, C, D

Columbia Generators are the simplest and most efficient—no excess of gas, easy to charge and discharge.

Columbia Lamps are equipped with Genuine Bausch & Lomb Lens Mirrors—no cheap imitations.

Hine-Watt Mfg. Co., 58-60 Wabash Ave., Chicago, Ill.



The Speedometer of the Season of 1906

"THE SPRINGFIELD"

The Hit of the New York and Chicago Shows

This cut shows the instrument and all its fittings. It attaches to the dashboard by a jointed bracket, is driven by the gear shown, from either front wheel, by means of a double jacketed flexible shaft, the pinion bracket of which is universal and will fit to the steering knuckle arm of any American built car.

This instrument will tell HOW FAST you are going, HOW FAR on each trip and HOW MANY MILES your car goes the whole season.

Its Dial is Self Luminous and can be read after dark. Its accuracy at every mile is guaranteed. It is designed and constructed for long service. Balanced motions, Hardened Steel Parts, Self-lubricating throughout, water and dust proof, at twice the price it could be no better. All material and workmanship are the best. It is sold at only a fair margin of profit.

Price for any saved wheel with complete fittings:
50 Mile Combination Instrument..... $45.00
50 Mile without Odometer..... 35.00
80 Mile Combination Instrument..... 55.00
80 Mile without Odometer..... 45.00

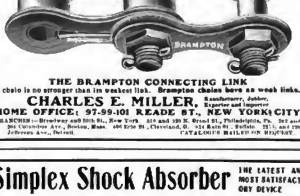
Patented in United States October 16, 1900. Patented in Canada, England and Europe. Other patents pending.

Manufactured by THE R. H. SMITH MFG. CO., Springfield, Mass.

ESTABLISHED 1902 INCORPORATED 1903

The Celebrated **BRAMPTON CHAIN**

Insist on having this chain on your 1906 car. It will not cost you or the manufacturer any more than any other make of chain



THE BRAMPTON CONNECTING LINK

A chain is no stronger than its weakest link. Brampton chains have no weak links.

CHARLES E. MILLER, Manufacturer, Jobber, Exporter and Importer

HOME OFFICE: 97-99-101 READE ST., NEW YORK CITY

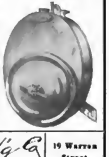
BRANCHES—Broadway and 50th St., New York. 314 and 320 N. Broad St., Philadelphia, Pa. 307 and 309 Columbus Ave., Boston, Mass. 406 Erie St., Cleveland, O. 1 and 3 Lafayette Ave., Detroit.

INSTALLING AGENTS IN EVERY CITY

1906 **20th Century** **OIL & GAS LAMPS**



AUTO LAMPS.
First Quality. Leading Styles. Vertical Sharp-cut Reflectors.
Bi and Motor Cycle, *Anti-rattle*, Driving Blast, Cast Brass Lanterns, etc.
GENERATORS that generate properly.
Square and Oval Shaped. Original Improvements.
New Separate Generator, Bicycle and Motor Cycle Lamps.
Horse and Tour Acetylene **GENERATORS.** A first class, safe, simple and cheap system of Illumination for Country and Suburban Homes, Churches, Stores, etc.



Send for Catalogues

20th Century Mfg. Co.

19 Warren Street Near B'way New York

Simplex Shock Absorber

THE LATEST AND MOST SATISFACTORY DEVICE



A shock absorber should notice or retard any motion of the spring, bound or rebound. It should not affect the resiliency of the springs.

It should increase or decrease its resistance according to the violence with which the motion occurs.

It should be powerful enough in its resistance to check any motion on the start.

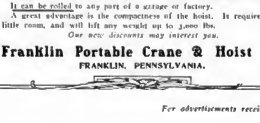
With our Simplex shock absorber we obtain the above results

MANUFACTURED BY

L. E. STACHL & COMPANY

Office: 262 West 43rd Street NEW YORK, N. Y.

The FRANKLIN PORTABLE CRANE & HOIST



Make it a simple matter for one man to lift a motor from a machine. In fact, one man with the aid of this crane can do the work of five men. It can be rolled to any part of a garage or factory.

A great advantage is the compactness of the hoist. It requires very little room, and will lift any weight up to 3,000 lbs.

Our new discounts may interest you.

Franklin Portable Crane & Hoist Co.

FRANKLIN, PENNSYLVANIA.

Veeder

"It's Nice to Know How Far you Go."

—Veeder Odometers.

THE VEEDER MFG. CO.

24 SARGEANT STREET

HARTFORD, CONN.

Cyclometers, Odometers, Tachometers, Counters and Fine Castings

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CLIMAX. BELLE



The Sensation of the New York Shows

Handsome in design.
Perfect in workmanship.
No unsightly chimney.
Concealed bracket lugs.
Powerful, highly polished condensing lens.

Open back and front, with patent safety locks on both doors.
All parts of the lamp get-at-able.
Riveted throughout.

Write for Catalogue and Prices.

SIBLEY & PITMAN
Manufacturers
CLIMAX MOTOR LAMPS CLIMAX AUTO CELLS
26 WARREN STREET, NEW YORK

A LOCK SWITCH



LOCK SWITCH SHOWING PLUG REMOVED

THE Lock Switch Mfg. Co.'s lock switch for motor-cars is specially designed to prevent theft or the use of cars when allowed to remain in the streets, roads, stations or garages. It is not a switch with a lock attachment, but a switch capable of being operated only by a specific form of plug to close the circuit.

Combinations innumerable are made so that switches are never duplicated. Each switch must have its circuit-closing members operated by its specific plug. There are no exposed terminals, all the parts being housed within the barrel and base, effectively destroying one of the most common faults of the present switches—imperfect contact.

Revolving the barrel will place one of the two sets of batteries in circuit, or both sets can be worked in multiple series. The plug closes the circuit through the switch after the battery connections have been made by operating the barrel.

To operate the switch the plug is first pushed into the barrel, the barrel then revolved until the desired set of batteries is in circuit, whereupon the plug is turned, closing the circuit through the switch. The circuit can be broken by turning either the barrel or plug back to initial position. The plug cannot be removed until the barrel is placed in initial position. The contact terminals in the base are kept clean by the wiping action of the switch bar. The switch is constructed of the very best material, the case being made of hard rubber and the exposed metal parts of brass, heavily nickel-plated. The switch complete costs $5.00, the company's address being 20 Broad St., New York. The switch is also adapted to be used on motor boats, being waterproof.

Spiral Tube Radiators





We recommend the Vertical, Spiral Tubed Radiators, which are becoming so popular among the higher class of automobile manufacturers. We make these Vertical, Spiral Tube Radiators out of all sizes of tubing, from ½ inch to ¾ inch. It is now an admitted fact that Spiral Tube Radiators are the best all-around Coolers for efficiency, lightness, strength and durability. We also build a full line of Hoods in any design or shape our customers may desire. Our new catalogue, illustrating many new styles and types, and containing much valuable information is now in press. Don't fail to get a copy before deciding on your 1906 equipment.

Long-Turney Manufacturing Co., Rome, N. Y.
ONLY LICENSED MANUFACTURERS OF SPIRAL RADIATOR TUBING

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GRAY & DAVIS LAMPS



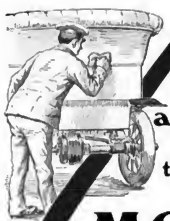
Hit the Bull's Eye of Perfection.
Be sure You have them on Your Car.

· GRAY & DAVIS ·
AMESBURY, MASS.

PHARES
C. BILLY



Smith & Mabley
Incorporated
SALESROOMS: Broadway, 56th and 57th Sts., NEW YORK
Sole Agents in the United States for the celebrated
BILLY LAMPS
FOR AUTOMOBILES AND AUTOMOBILE BOATS



Keep it new and bright with the new cleanser
MOBO

Elbow grease and common soap will not preserve the polish of an automobile. It may remove the dirt—but the shine goes too. Mobo is unlike any other substance for cleaning automobiles, preserving and restoring the original lustre; removing grease and travel stains. Mobo is a preserver—it prevents blistering and cracking of the painted surface. Absolutely harmless to the hands. Can be used on the leather work of the automobile (also harness) as well as the wood and metal work.

Put up in 2 lb. and 8 lb. cans; also in tubs, half barrels and barrels. If your dealer hasn't it—tell us, we will see that you do get it.

JOHN T. STANLEY
644 W. 30th St. NEW YORK

SUNLYTE LAMPS

French Style
$12.50

The scientific principle of reflection through a condensing bull's-eye lens has proven the greatest light projector known, and this principle is utilized in our Ai Sunlyte lamp. The focus is just right and the result is both long and diffused rays of light. Made of heavy brass, highly polished, and though low in price is warranted to give the greatest satisfaction.



MARCHAND FRENCH HORNS

Dragon Type
$8.00

Marchand horns are made to alter tube to drop from horn at an angle of 135 degrees and is heavily braced at point where tube attaches to horn. Flexible turn snakes a long sounding chamber, giving the horn a deep, musical bass tone.

Other styles of horns from $5.25 to $12.50. Send for catalogue.



New York Sporting Goods Co. 17 WARREN STREET NEW YORK, U. S. A.

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1903 Model

Disgusted with gas?

You don't need to put up any longer with defective gas generators and dangerous compressed gas systems.

The Neverout

TRADE MARK

Patent Invertible

Safety Gas Producer

for motor-cars and boats makes gas only as needed and gives an intensely white, powerful flame that can't be equalled by any other method.

Costs less than ¼ cent per hour.

No danger of explosion, no after-generation. Instantly lighted and extinguished by one turn of the hand.

No trouble, no dirt, no odor.



Neverout Safety Gas is as far superior to all other kinds of gas as

The Neverout

TRADE MARK

Mirror Lens Searchlight

is superior to all other searchlight projectors.

Money back if not satisfactory.

Write for free booklet.

ROSE MANUFACTURING CO., Largest searchlight factory in the world. 914 Arch Street, Philadelphia.

FOR SALE. Imported Renault Car

14 H. P. Landaulet; also equipped with extra open body. In first-class condition. A quiet, reliable car, handsomely fitted up. Price, $3,500.

Address TOWN, Care of "Motor" 1789 Broadway, New York City

A NEW CIRCULATING PUMP.

THE New York Gear Works, 56-58 Greenpoint Avenue, Brooklyn, N. Y., manufacturers of the Ball Bearing Transmission Gear for motor-cars and Reverse Gears for motor-boats, has recently put upon the market a geared circulating pump as shown in the illustration. This pump is made of bronze and is non-corrosive. All bearings are lined with anti-friction metal which more than doubles the lasting qualities of the pump.

The New York Gear Works claim that this new pump is the best on the market, as the gears and shafts are made of bronze in one piece, which does away with keys and pins. There is therefore no possibility of the running parts sticking fast by rusting of an iron or



GEARED CIRCULATING PUMP.

steel shaft, and no chance of the parts working loose.

These improvements add greatly to the value of the pump. It is designed to run about six hundred revolutions a minute, weighs five pounds, and is tapped for a ½-inch inlet and outlet.

WHY TIRES WANT WATCHING FOR UNEVEN WEAR.

TO the novice especially it is scarcely likely to suggest itself that there can be any appreciable difference in the wear and tear on each of the four tires of the same car. Yet there is a marked distinction, and an obvious one. In the first place, the rear wheels are daily doing more work than the front ones, because they carry more weight; but the real danger arises from a less obvious reason, and that is that the wheels on the right hand side of a car are hourly doing infinitely more work, or rather infinitely harder work, than those on the left hand side. Why? Well, that is very simply answered. Motor-cars approaching each other have their left hand wheels nearest to the center of the road; as each motor-car approaches the other, the respective drivers draw into the righthand side of the road, and the right hand wheels run over the rough, raw, stony, rutty margins of it, and, as soon as the approaching motor-car has passed, rasp out of the ruts again, in towards the better going on the center of the road. By that time the strain on the right hand wheels has peeled off quite an appreciable quantity of rubber, and when this operation has been repeated a few hundred times, which may happen in a month, the right hand wheels have been materially injured. That is why the tires want watching, and shifting from side to side occasionally.

THE SOLAR

IS A HIGH PRICED LAMP

And yet **three** makers alone will equip $95,000 worth of Solars to their 1906 cars—the contracts were **signed last October.**

What does that mean to any dealer selling Auto lamps? Doesn't it mean that there is absolutely no lamp to compare with the Solar at **ANY** price? If there was, don't you suppose those makers would have found it—since the Solar is admitted the highest priced lamp the trade knows? **You** know those auto-builders knew what they were about when they bought nearly a hundred thousand dollars, worth of Solars . . but do you know why it will pay **you** to push the Solar for 1906? Ready to tell you whenever you ask.

BADGER BRASS MANUFACTURING CO.

Kenosha, Wisconsin 11 Warren Street, New York City

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The Bullard Speed Recorder

Time indicated 24 minutes past 10 o'clock.



Indispensable to Owners of Automobiles

It tells the time, speed, distance, and makes a permanent record on a card of every mile traveled, when and how long stops were made and the total mileage for the season. It is the only instrument that will accurately record any speed from one mile per hour to that at Ormond Beach without changing its mechanism.

Indispensable Evidence in any Court of Law

And a sure protection to every honest Automobilist

Send for Booklet

J. H. BULLARD, Springfield, Mass.

Springfield Auto Garages!



Portable

Save Storage Bills

No carpenter required. Can be erected complete in two hours by unskilled help. All styles and Sizes.

$75.00

Upward

Look for our exhibit at the Boston Show, Space 262, Dept. E.

SPRINGFIELD MOULDING WORKS

52 Waltham Avenue, Springfield, Mass.



GARAGES

Portable, and of Architectural Design

PRICE, $100.00 AND UP.



Portable Dwellings, Stables, Boat Houses, Camps and Out-Buildings of all Descriptions

PRICES ON APPLICATION

C. & A. Patented Building Construction Co.

170 BROADWAY, NEW YORK



Before purchasing your **HAMPER** for your side entrance car, you should call and see a few of the many styles which we manufacture. All of these are made of sole leather, with patent-leather finish, and are absolutely dust and waterproof. In writing state style of car

JOHN BOYLE & CO., 112 & 114 Duane Street, Dept. L., New York City

We are also in position to furnish **Rear Hampers** for any side entrance car on the market.



GILBERT AUTOMOBILE SUPPLIES

ORIGINAL AND BEST

We Make

THE GILBERT TIRE CASE — **KNUCKLE BOOTS**

INNER TUBE CASE — **LAMP COVERS**

STORM APRONS — **LEGGINGS**

TOOL ROLLS

ALUMINUM AND BRASS TIRE HOLDERS

A few misguided firms will offer you imitations Don't be the goat. There's reasons:

Poor Stuff. Big Profit

Sold by all leading firms. **Catalog on request**

GILBERT MFG. CO.

NEW HAVEN, CONN.

See Self-Fastening Style, all sizes, price $4.00



The Brilliancy

of your AUTO can be quickly ruined by neglect or by the use of injurious soaps

FISK'S AUTO-CAR SOAP

Removes grease and mud from highly finished surfaces, whether wood or metal, and leaves neither streaks nor stains.

Use Fisk's AUTO-CAR SOAP

And preserve the original luster of your machine.

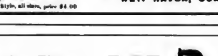
Price, in 5-lb. pails, $1.00, express paid. Special prices in quantities.



Fisk Mfg. Co., **Springfield, Mass.**

(Makers of Japanese Soap)

Established 1837.



Specify the Autochime On Your 1906 Car

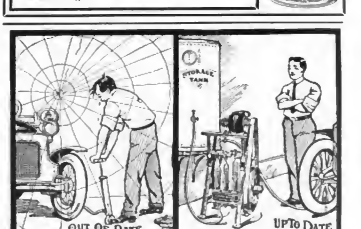
It is the best exhaust-blown alarm on the market, because it is made of only one tube of finely polished brass divided into compartments, and so constructed as to give a rich, musical chime.

It is small and compact and has no soldered parts to melt, no pockets to collect the dirt or soot, and when correctly attached will positively not clog up or get out of order.

Price $15.00, including valve and foot pedal.

GRAY-HAWLEY MFG. CO.

605-609 Fort Street, West, DETROIT, MICH.



Garage Equipments The modern garage must have AIR ON TAP at high pressure always ready for filling tires. We manufacture Power Compressors, Electric, Belt or Direct Driven from Counter Shaft. Full outfit of tanks, gauges and fittings—regular and special—booklet for the asking. Estimates given on all kinds of air conveyance outfits. **GLEASON-PETERS AIR PUMP** Houston and Mercer Streets, New York City, U. S. A.

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IMPROVED TRUFFAULT-HARTFORD SHOCK ABSORBER

TRADE MARK

Increases the speed.
Enables cars to proceed at highest speed over all obstructions.
Doubles the life of tires.



Prevents lost traction.
Absolutely prevents breaking of springs.
Makes cobblestones and rough roads seem like asphalt.

WARNING

WE are the owners of Fundamental Patents entirely covering every practicable form of frictional retarding devices for vehicle springs, and hereby warn the trade from handling any infringing devices which may be offered for sale. We also warn the trade against the use of the term "SHOCK ABSORBER," which is our registered trade mark.

New Model Absolutely Self-Adjusting
Requires No Attention After Application

Adapted by the

Pierce Great Arrow, Locomobile, Matheson, Richard-Brasier, Peugeot, Napier, Gobron-Brillié.

Send for Booklet

CARS UNDER 1,500 LBS., $40.00 (Four Suspensions)

CARS OVER 1,500 LBS., $60.00 (Four Suspensions)

HARTFORD SUSPENSION CO.

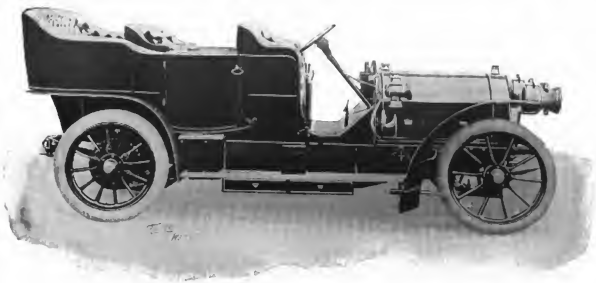
E. V. HARTFORD, Pres. 67 VESTRY STREET, NEW YORK

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GOBRON-BRILLIÉ

"THE FINEST AUTOMOBILE IN THE WORLD"



THE FACT that it is no longer necessary to go abroad for a "Gobron-Brillié" will be welcomed by the American public. The importation of this wonderful car brings to this country an automobile whose foreign reputation has placed it in a class by itself in the estimation of those who KNOW.

We court comparison with the renowned products of the world, knowing that every demonstration of the Gobron-Brillié PROVES it beyond a doubt the—"Finest Automobile in the World."

THE Reciprocating Motor is a distinctive feature. Four Cylinders, eight pistons. Ignition between pistons driving one up—the other down—making the ONLY PERFECTLY BALANCED ENGINE.

No Vibration. The Flexibility of Steam. Consumes Only One-Half the Gasolene of Other Cars. Self-Adjusting Carburetor. Can be Started on Fourth Speed.

We are prepared to take orders for Cars with a guaranteed speed of 120 miles an hour on the road.

DEMONSTRATIONS AT YOUR CONVENIENCE.

Write for testimonials and details.

HARTFORD SUSPENSION CO.

E.V. HARTFORD, Pres. 67 VESTRY STREET, NEW YORK

SOLE IMPORTERS

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Dietz Lamps

Oil Motor Lamps for 1906

The Highest Grade Lamps in Operation, Workmanship and Style



Peerless W
List $9.00 Each

Our new styles for 1906 are the acme of finish, and your car will not be as complete as it should be unless you have it fitted with Dietz Lamps.

As in the past Dietz Lamps are furnished with the most convenient devices for operation of any on the market. They have drawn aluminum reflectors easily removable for cleaning. The reflectors are properly shaped and focused so as to get complete advantage from the flame.

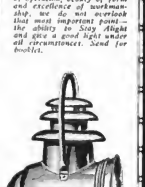
In securing convenience of operation, beauty of form and excellence of workmanship, we do not overlook that most important point—the ability to keep Alight and give a good light under all circumstances. Send for booklet.



Peerless R. List $7.00 each



Dainty Side. List $5.50 Each



Peerless O. List $5.50 Each

R. E. DIETZ COMPANY, 37 Laight Street, New York

Established 1840

DO YOU want to buy or sell a second-hand car? See Motor Bureau, Page 9.

CLARK STEAM CAR



—THE—
Most Luxurious Steam Car Built in America : : :

Will Exhibit at Boston Auto Show.

SEND FOR CIRCULAR

Highest Grade of Workmanship Throughout

Flash boiler, four-cylinder poppet valve engine. Adjustable stroke pumps. Clutch and shaft drive. Movable steering column, locking chromic valve.

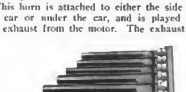
EDWARD S. CLARK, 272-278 Freeport St., BOSTON, MASS.

EIGHT-CHIME GABRIEL HORN.

THE Gabriel Horn Mfg. Company, Cleveland, Ohio, have lately invented and put upon the market an eight-chime horn for motor-cars and motor-boats.

They have been manufacturing for some time a two, three, and four-chime horn but this is their first attempt at putting anything in a strictly musical line on the market.

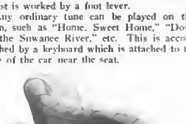
This horn is attached to either the side of the car or under the car, and is played by the exhaust from the motor. The exhaust is



THE EIGHT CHIME GABRIEL HORN.

regulated by a valve, which they also manufacture in connection with the horn. The exhaust is worked by a foot lever.

Any ordinary tune can be played on this horn, such as "Home, Sweet Home," "Down on the Suwanee River," etc. This is accomplished by a keyboard which is attached to the side of the car near the seat.



SHOWING THE KEYBOARD ATTACHED TO SIDE OF CAR.

The tone of this horn is a beautifully modulated chime and is superior in volume and range to anything heretofore produced. It is made of brass, beautifully polished and lacquered, to prevent tarnishing.

SNAPIT LOCK SWITCH.

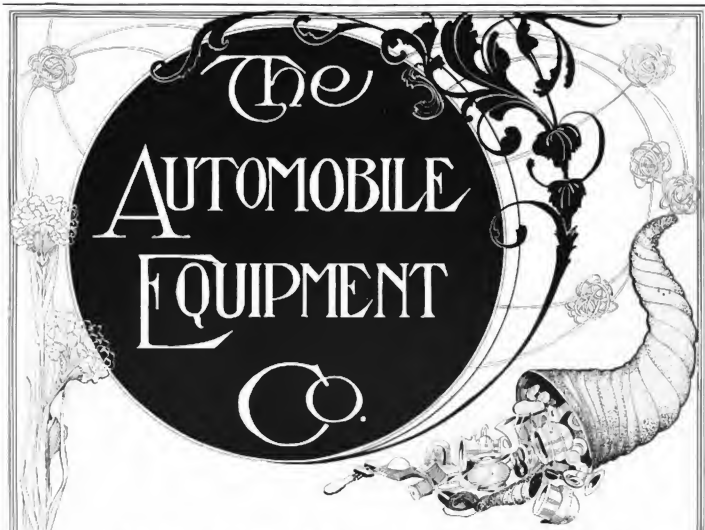
THE Snapit lock switch for motor-cars, motor-boats, and launches has the contact blade in one piece, doing the work of both. All the mechanism is contained on a single block of fibre, the outer cap fitting snugly on its metal base, and while it is thief, dust, and water proof, can be quickly reached by the owner with his key giving him instant access to the mechanism. The outer cap can be removed and replaced without tools.



The Snapit is as smooth as a bar of soap. The polished brass outer case has no obstructions on its surface, all screws and mechanism being concealed. It is arranged to be attached to one or two sets of batteries or batteries and dynamo, the "Snapit" being also securely locked when the current is turned off.

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THE HORN OF PLENTY

With Plenty of Horns, Lamps and all Automobile Paraphernalia that the Motorist Can Want . .

AGENTS FOR

CONTINENTAL TIRES **WITHERBEE STORAGE BATTERIES**
AUTOMOBILE COILS **TIRE GRIPS**
AMERICAN SEARCHLIGHTS

Just to mention a few lines

MANUFACTURERS OF EXTENSION TOPS
THE BEST $75.00 TOP ON THE MARKET

RAIN APRONS (Patented), CHAIN BOOTS, DRIP APRONS
LAMP COVERS, TIRE COVERS, ETC.

Write for Catalogue of Specialties and 1906 Prices

WE SEEK TO PLEASE

AUTOMOBILE EQUIPMENT CO.

253 Jefferson Avenue, Detroit, Mich.

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CARTERCAR

"The Car Ahead"



MODEL A.

A DEMONSTRATION of the CARTERCAR will convince any one, who is familiar with automobiles, that the CARTERCAR, *friction driver*, is not only *practical*, but *reliable* under *all conditions*.

¶ Before the Cartercar Friction Drive will slip, you will stall the engine.

¶ We claim for the CARTERCAR *extreme Simplicity, Durability and Reliability.*

¶ The CARTERCAR has been put to the most severe tests the *past two years*, by *owners* who have operated them constantly, owners who are willing that *their names* be used.

¶ We are not making any claims that cannot be substantiated, *we prove all our claims* by a practical demonstration.

¶ We want to hear from high class agents throughout the country.

¶ Our catalog contains full details—sent on request.

MOTORCAR COMPANY, 220-230 TWENTY-FIRST STREET DETROIT, MICH.

Pierce-Racine:

Four Models

MODEL A-3
12 H. P. Twin Cylinder Runabout,
$750.00

MODEL B-2
16 H. P. Twin Cylinder Light Touring Car.
$1150.00

New England Agents:
BUTLER MOTOR CAR COMPANY
998 Boylston Street, Boston, Mass

Cut shows our 14 H.P. Twin Cylinder Light Touring Car
The best in the world for the money.
Send for printed matter.



MODEL A-4
14 H. P. Twin Cylinder Light Touring Car.
$850.00

MODEL C
24 H. P. Four Cylinder Touring Car.
$1750.00

New York Agents
GANTERT & PAUL
60-62 West 116th Street New York City

PIERCE ENGINE COMPANY, 1952 CLARK STREET RACINE, WISCONSIN

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Aerocar



The Car for Today, Tomorrow and Years to Come

24 H.P. four Cylinders—45 Miles an Hour Five Passengers—Weighs under 2000 pounds Price f. o. b. Detroit, $2,800

The guaranteed motor of the *Aerocar* has, after the keenest critical inspection, met the undivided approval and earnest commendation of the most reliable motor authorities.

The graceful design, equipment and finish of the body of the *Aerocar* has been especially admired. Write your account it has been conceded the equal in general excellence of any car of either American or foreign make.

We ask the opportunity to furnish you with literature and detailed information. A postal card will bring it.

Some good territory is still open to agents who write promptly.

The Aerocar Company

DETROIT, MICH.

Imperial Auto Co., 1024 Boylston St., Boston, Mass.
Aerocar Co. of Chicago, 347-349 Wabash Ave., Chicago, Ill.
Oscar M. Bergerstrom, Minneapolis, Minn.
Members American Motor Car Manufacturers Association

GAS-AU-LEC

"THE SIMPLE CAR"



Elegant in Finish
Luxurious in Appointments
Built by Skilled Workmen from the Best Materials obtainable

The Simplest Gasoline Car in the World

Both as to Construction and Control and the easiest to operate and maintain. Not only eliminates many objectionable features common in automobile engineering, but possesses points of excellence not found on any other car.

Positively self-starting from the seat every time

No cranking under any circumstances.

40-45 Horse Power with Quinby Aluminum Tonneau $5,000

Limousine or Special Bodies to Order.

"Marks a New Era in Automobile Construction"

CORWIN MANUFACTURING COMPANY

Peabody, Mass., U. S. A.

Model F Cleveland 30-35 H. P.

5 to 35 miles per hour on third speed. Guaranteed for one year.

THE CAR WITHOUT A WEAK SPOT

CONSIDER THE COST OF MAINTENANCE

It isn't the first price of a car that should be considered.

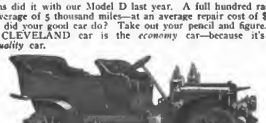
A good car costs a good bit of money—because high grade design—material and construction are expensive. But a *good* car is cheaper to maintain than a car that sells for a dollar less than a good car can be made for.

The CLEVELAND will run longer and do harder work at less repair cost than any American or Foreign car for that matter—because there's not a weak spot in its entire construction.

If you could run a 30-35 H.P. Car for ten thousand miles at the cost of a barrel of gasoline in repair bills, wouldn't it make *that car* worth while?

Dozens did it with our Model D last year. A full hundred ran an average of 5 thousand miles—at an average repair cost of $4.00. What did your good car do? Take out your pencil and figure.

The CLEVELAND car is the *economy* car—because it's the *quality* car.



Double Tulip body. Price, $2,500.00. Standard Victoria Body at same price, if preferred.

SPECIFICATIONS

4-cylinder 30-35 H. P.
Imported Simms-Bosch Magneto—automatic make and break spark.
Direct drive. Nickel steel I-beam front axle.

Selective sliding gear transmission.
Shaft drive.
Timken roller bearings throughout.
36x4-inch wheels. Ball bearings. Wheel base 102 inches.
Ventilated fore-door.
Weight complete 2,600 lbs.
Handsomely upholstered.
Body option Victoria or Tulip, as illustrated.

Our catalogue illustrates and describes in detail the wonderful mechanism which makes the CLEVELAND the cheapest of all cars to maintain. FREE on request.

Cleveland Motor Car Company, Dept. 1, Cleveland, O.

New York: E. R. Gallaher, 226-230 West 58th Street, Gen'l Eastern Distributing Agent.
Boston: Butler Motor Car Company, 998 Boylston Street.
So. California: A. F. Worthington, Los Angeles
Buffalo, N. Y.: Cleveland Automobile and Cycle Co.
Chicago: The Canada-Fairbanks Co., 1413 Michigan Ave.
St. Louis: St. Louis Automobile Co., 3685 Olive St.

The Jewell



8 H. P. Gasoline.

A PERFECT CAR for $400.00

¶ The business and professional man's car.
¶ The finest runabout on the market at ANY PRICE.

THE

Forest City Motor Car Co.

MASSILLON, O., U. S. A.

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MODERN COMMERCIAL CARS

Built for Business and Pleasure

Trucks, Delivery Wagons, Omnibuses and Sight-Seeing Cars

GASOLINE
and
ELECTRIC



This is our 16 Passenger 4-cylinder Gasoline Wagonette or Opera Bus. 35 H. P. Sliding Gear Transmission, Double Chain Drive. Upholstered in Genuine Leather. The most handsomely finished and most luxuriant car on the market.

PRICE COMPLETE, $3,500

☞ This is the car that attracted so much favorable attention at the Automobile Club Show at the Armory in New York. Send for Specifications and Prices of other sizes and designs.

***The* Auto-Car Equipment Co., Mfrs.**

BUFFALO, N. Y.

NAPIER



Napier Touring Car, 60 H.P. Six Cylinder. Model of 1906. Price, complete with Top, **$8,000.00**

Finest of Material, Workmanship and Finish

The Napier is not only the best and most comfortable car, but the most elegant one built in America

45 H. P. 4-cylinder, complete with Top,	18-20 H. P. 4-cylinder Runabout. Two styles.
$6,500.00	**$2,250** and **$2,500**

Napier Motor Company of America

743 Boylston St., BOSTON, MASS.

☞ NEW YORK BRANCH: 1610 Broadway

ROYAL TOURIST.

(*Continued from page 53.*)

strength, so that it will not sag or become distorted from the hardest possible use to which the car may be put. The spring hangers are made of drop forgings. No vital part of the frame or fasteners is made of anything but the best steel forgings.

The dash is an aluminum casting, with all the necessary parts cast on it. The oiler is a positive feed type of oiler, and the entire oiling system is in plain sight. The coil mounted on the dash is a quadruple coil of recognized merit. The radiator is of the cellular type, amply large enough to take care of the cooling under the most adverse circumstances. The motor absolutely will not run hot with this radiator only half full of water. The fan is of large diameter, securely fastened to the motor, and it is driven by a large "V" shaped belt. This fan draws air through the entire radiating surface.

The body is "King of the Belgians" style, with side opening doors. It is luxuriously upholstered, and has every necessary feature provided for comfortable touring. Ample provision is made for carrying tools and luggage. Twenty-two gallons of gasoline is the capacity of the gas tank, which is sufficient to carry the car 250 miles. The wheel base is 110 inches, tread being standard.

MARSH QUICK DETACHABLE RIM—DIAMOND RUBBER CO.

At the Chicago Show some interesting features were presented by the Marsh quick detachable rim for clincher motor-car tires, exclusive control of which has been vested in The Diamond Rubber Co. The rim consists of three parts—the rim body proper which is permanently attached to the wheel, the removable outer flange of the rim and a locking ring which holds the removable flange in place. There are no separate small parts. The locking ring is U shaped. It is held in position by expansion, but its security in place is further strengthened by the use of a small, easily operated lock. The U shape of the locking rim causes it to engage a bead projecting downwardly from the rim flange, which it holds in place, making the escape of the flange impossible whether the tire is inflated or not. The entire mechanism is very simple and the ease of manipulation attracted considerable attention.

No tire staybolts are used with the Marsh rim, but as an additional safeguard against "creeping" the inner tubes of the tires are fitted with a rubber-headed staybolt which becomes a part of the metal valve stem of the tube, and is tightened or loosened simultaneously with the tightening or loosening of the lock nut of the valve stem.

The illustrations of the rim will be found in the story of the Chicago Show.



Chauffeur Jones: GEE! WHAT RUBBER TIRES!

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1906 Acme

"From Steel Bar To Finished Car"

We Manufacture Not Merely Assemble

Every part, no matter how small, is made wholly by this company, and receives a searching factory and road test, which permits our giving

A Year's

Absolute Binding Guarantee

With Every Car

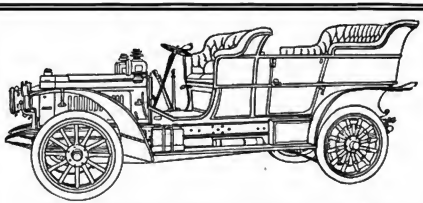
Type XIV
5-Passenger Tonneau
4 Cylinder—30-35 H.P.
Speed Limit 50 miles
Price $2,750.00

Type XV
7-Passenger Touring Car
4 Cylinder—45-50 H P.
Speed Limit 60 miles
Price $3,500.00



Let an "ACME" prove its own merits. Arrange by mail for a demonstration at any of our branch offices or write direct to the factory.

ACME MOTOR CAR COMPANY **READING, PA.**



THE VIQUEOT CAR

28-32 Horse Power
Silent, Simple, Ease of Control

40-45 Horse Power
Speed, 5 to 70 Miles an Hour on High Gear

The Viqueot Cars are made by the Viqueot Company at its own works in France. The Viqueot Company is the only American concern manufacturing automobiles in France with its headquarters in America.

The purchaser therefore receives the greatest possible value in buying a Viqueot, because Viqueot Cars are sold direct and guaranteed by the Viqueot Company, thus eliminating the usual commissions and enormous profits of dealers and agents, thus assuring to the purchaser complete satisfaction in his dealings with the company at its home office.

The chassis are made with special reference to the necessity of having extra strength in axles, steering gear, springs, and all parts of the car requiring strength. The cars are of modern weight, therefore insuring economical operation and long life for the tires. Pressed steel frame, "I" beam axles front and rear. Individually cast cylinders, ball bearings used throughout the chassis. Carburettor automatically governed.

The bodies for the Viqueot cars are the most luxurious in detail ever made. The seating capacity of all types is seven people.

We have ready for immediate delivery, Double Phaeton, tulip form; Limousines and Detachable Limousines and Landaulets in all colors and trimmings. Bodies and chassis painted and trimmed to meet the Special requirements of the purchaser.

The design of the chassis and the improvements which have been made give the Viqueot a superiority over other cars, for which we challenge comparison with any make car for general results and economy in operation.

The ability of the Viqueot car to negotiate steep grades on the high gear admits of no comparison.

28-32 H. P. - - - $5000.00
40-45 H. P. - - - 7500.00

Do not buy an automobile until you have seen the Viqueot. Remember that the Viqueot car is sold directly by the Viqueot Company and has no connection whatever with any dealer or agent of automobiles.

THE VIQUEOT COMPANY

Works: Paris, France **215-217 West 48th St., New York, General Offices and Salesrooms**

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BOLLEE

A TOURING CAR *of the* HIGHEST GRADE



Judge its standing by this list of some of the most prominent purchasers of BOLLEE CARS

T. A. Havemeyer	Joseph E. Widener	Ernesto G. Fabri	J. C. King
Cortlandt F. Bishop	A. G. Hodenpyl	Alfred G. Vanderbilt	E. L. Ryerson
John F. Talmage	W. P. Hamilton	H. P. Whitney	George C. Rand
C. L. Blair	William Rockefeller	Charles Carroll	H. O. Havemeyer
J. Borden Harriman	James Stillman	Royal P. Carroll	B. B. Odell, Jr.
Payne Whitney	Oliver Ames	George J. Gould	Whitelaw Reid
Wm. Payne Thompson	J. M. Ellsworth	Louis S. Thompson	Col. A. R. Kuser

IMMEDIATE DELIVERIES **STORAGE AND REPAIRS**

OUR NEW GARAGE WILL BE OPENED
TO THE PUBLIC MARCH 15, 1906

Dealers in all Makes of Foreign Motor Cars

CRYDER & COMPANY

T. A. Havemeyer *Henry C. Cryder*

N. E. Corner Park Avenue and 53d St.
NEW YORK

EXCLUSIVE AGENTS IN THE U. S. FOR LEON BOLLEE MOTOR SYNDICATE, Ltd.

THE 1906 IROQUOIS CARS.

Type "R." 20 H. P., large touring car, seating seven, $3,250 f.o.b. Tiffin Top Tonneau, special detachable chairs, $150 extra. Type "C." 16 H. P., touring car, seating five, 4" tube tires, same equipment as Type "R" except full elliptic springs both front and rear, with or without detachable tonneau seats. Price complete with top and tonneau $2,750 f. o. b. Seneca Falls, N. Y.

IROQUOIS MOTOR CAR CO., Seneca Falls, N. Y.
Will exhibit and demonstrate at Boston show March 10th, 1906.

THE MARION

Simplest and strongest construction. Easiest to understand. Easiest to operate.

Marion Motor Car Company
Indianapolis, Ind.

High Grade Electric Vehicles

Stanhopes, Coupes, Surreys, Depot Wagons. Guaranteed to make 75 to 85 miles per charge. Handsome in design and finish—mechanically perfect. Write for our new Catalog A-3.

The Rauch & Lang Carriage Company
06-408 Superior Street, - Cleveland, Ohio

Rainier

THE PULLMAN OF MOTOR CARS

Guaranteed Free of Repairs
for one year

Good Agents wanted in unassigned territory

THE RAINIER CO.,
BROADWAY, cor. 50th St., New York

THE FAMOUS ITALIAN AUTOMOBILE

ZÜST

Simplest Strongest, Fastest
on exhibition at our private garage, 124 E. 19th Street
R. BERTELLI & CO.
Phone 1003 Gram.

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MOTOR-CAR USERS IN FRANCE.

It is interesting to inquire in what class of professions the motor-car is most commonly adopted as a habitual auxiliary. Apropos of this, a report by M. Hennequin gives the following data.

In 1904, in France (the department of the Seine excepted) there were 3,485 operators entitled to a tax rebate of one-half, distributed professionally as follows:

1.	Physicians, veterinary surgeons, dentists, pharmacists, druggists and herbalists	1,109
2.	Superintendents of industries, engineers, architects, manufacturers, contractors, machinists, locksmiths, joiners, chimney builders and house painters	359
3.	Travelers, commercial drummers, brokers and business and insurance agents	254
4.	Distillers, brewers and dealers in wine, beer and spirituous liquors	211
5.	Manufacturers, dealers, and hirers of vehicles of all kinds	171
6.	Landowners, farmers, gardeners, dairymen, cheese manufacturers, and millers	133
7.	Dealers in fabrics, notions, underwear, hats, shoes and clothing	133
8.	Dealers in iron, hardware, copperware, tinware, and cutlery	125
9.	Dealers in groceries, pastry, preserves and chocolate	92
10.	Bankers and merchants	86
11.	Clockmakers and jewelers	65
12.	Weavers and loom manufacturers	50
13.	Manufacturers and refiners of sugar, chemical products, oils, and soaps	44
14.	Dealers in grain and fertilizers	44
15.	Printers and paper and book sellers	36
16.	Coal merchants	21
17.	Hotel keepers	20
18.	Butchers and bakers	20
19.	Ministerial officers	12
20.	Tapestry workers	11
21.	Miscellaneous	405

There are some curious deductions to be drawn from what precedes. We have remarked the large number of medical men who use the motor-car for the purposes of their profession. They alone own about a third of the number of vehicles entitled to the tax rebate; but what is still more extraordinary is that the figure 1,109 represents but 12 per cent. of the physicians who own motor-cars in Paris at least, where they number 1,934, and where but 25 make use of their carriage for visiting patients. At Marseilles, there are but two doctors out of 446 entitled to the tax rebate who daily use their vehicles for the practice of their profession. At Bordeaux, there are but 3 out of 277, and at Rouen none out of 91.

The professional motor-car is therefore, it seems, especially appreciated by physicians practicing in the country and obliged to make long trips every day.

This appears reasonable, but how can we suppress our surprise at finding that the motor-car is not employed to a greater extent by commercial travelers and insurance agents whose business obliges them to be constantly on the go and to visit many places not reached by railway.

THE number of motor-cars registered in France in 1904 was 25,017, of which 18,992 were for more than two passengers, and 6,025 for one or two:

If we compare these figures with those of the five years previous, we find:

	Motor-Cars. 2 passengers.	*More than 2 passengers.*	*Total.*
In 1899	946	726	1,672
In 1900	2,042	2,884	5,386
In 1901	2,493	2,893	5,386
In 1902	2,512	4,748	7,260

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"As good as it looks"

When Instant Control Counts

A second's delay in mastering your car may mean a tragedy.

In a flash an emergency—run-away, fire-engine, street-car or railway train—may confront you; a child may dart across your path—and not only instant action on your part, but instant response on the part of your car is required to avert disaster.

The Stoddard-Dayton Car

IS NEVER BEYOND CONTROL

The spark and throttle levers are situated on the steering column, directly beneath the wheel, in position to be operated by the fingers of the left hand.

The driver is thus able to guide the car and to maintain ordinary control with the left hand, leaving the right hand free to use the emergency brake lever when required.

This lever is located on the right side, outside the frame, back of the front seat, being entirely out of the way, but instantly accessible. Foot brake is placed just behind the transmission, works in a dust- and mud-proof case and is powerful enough to slide the rear wheels.

The STODDARD-DAYTON has surpassing strength and endurance, because the frame is made from wonderfully toughened, hot rolled, high carbon steel; it will not deflect. The weight is so perfectly distributed that no point comes in for undue strain (even the rear axle, instead of bearing dead weight, acts simply as a propeller, the weight being carried on the axle-housing by means of roller bearings on each rear wheel). The speed change being of *selective type*, permits instant change of speeds, from high to intermediate, or vice versa, while going 25 miles per hour, uphill or down, without clashing or friction. Adjustable roller bearings are used throughout the entire transmission and there is generous lubrication mechanically provided everywhere.

The 1906 five-passenger STODDARD-DAYTON MODEL D TOURING CAR, 4-cylinder (4½x5), water-cooled, *selective type*, sliding gear transmission; three speeds forward and reverse; 30-35 horse-power; proportion of power to weight—one horse-power to every sixty pounds. Price, $2,250. Immediate delivery.

HANDSOME NEW CATALOGUE MAILED FREE

The Dayton Motor Car Company, Dayton, Ohio

Why Buy in Paris?

Mercedes Cars are sold cheaper in London than in Paris

All foreign cars sold in Paris are subject to Import Duties; England having Free Trade, imported cars are subject to no duty whatever. If therefore you buy from us in London you will save the duty, for example:

A 35 H. P. Mercedes Car - - costs in Paris, $5,441.00
" " " our London price, 5,246.00
WHAT WE SAVE YOU,— $195.00

If you buy in London now you will gain a further advantage of having your car immediately at your disposal for Touring on your arrival.

We are the Sole London Agents for Mercedes, and authorized Agents for Panhards. If you are going abroad to buy your car this season we invite you to correspond with us before purchasing.

J. E. Hutton, Ltd.

81 and 83 Shaftesbury Avenue, London, W.

Telegrams, "Horselaugh," London

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The World's Champion
Brasier
(formerly Richard-Brasier)

25-36 H.P.
1906

E. B. Gallaher
228-230 West 58th St., N. Y.
Tel., 1293 Columbus Cable Addresses, Brasier, New York Gallaher, Paris.



AGENT AND SOLE IMPORTER
Richard-Brasier
GENERAL EASTERN DISTRIBUTER
The Cleveland Car

PARIS, No. 11 RUE D'ALGER



The Circulation of Motor

is larger than that of any other motoring publication in the world. By larger we mean not only a larger total print, but also more paid subscribers and more newsstand sales. Our books are always open to our advertisers

	Motor-cars, 2 passengers	More than 2 passengers	Total.
In 1903.....	5,546	14,340	19,806
In 1904.....	6,025	18,992	25,017

This table shows at a glance how disturbed were the beginnings of automobilism. From 1899 to 1900 there was a considerable stride forward, then a halt, and afterwards a slight advance, after which, the movement having become definitive, there was a great increase, especially from 1902 to 1903.

The following are the percentages of increase from year to year:

From 1899 to 1900		216	per cent.
" 1900 to 1901		2	" "
" 1901 to 1902		33	" "
" 1902 to 1903		174	" "
" 1903 to 1734		25	" "

During the five last years, from 1899 to 1904, the total increase in the number of motor-cars was 1,396 per cent.

France exported:

In 1897, cars to the value of			$155,750
In 1898	"	"	437,250
In 1899	"	"	1,064,750
In 1900	"	"	2,334,250
In 1901	"	"	3,945,500
In 1902	"	"	7,554,750
In 1903	"	"	12,709,250
In 1904	"	"	17,325,500

This last figure represents no less than 71,302 quintals of merchandise (motor-cars and accessories.)

POPE-TOLEDO, TYPE XII.

(*Continued from page 54.*)

in proper mesh, regardless of any strain that may be experienced.

On the upper half of the transmission case, to prevent the gears shifting from their proper mesh, a rod operates a rocker arm and withdraws a plunger from holes situated in the moving gear shipper rod. This is a sort of breech-locking mechanism, making it impossible to shift the gears until the clutch is fully withdrawn. When the gears are shifted and the clutch released, a spring throws this locking mechanism back into position centering the gears into perfect mesh.

All the gears, shafts and other vital parts of the transmission are made from especially treated steel testing 225,000 pounds tensile strength to the square inch.

The air pump is of new design, having the pressure gauge situated on the dash.

The water cooler is the well-known Pope-Toledo "Planetie."

To test the efficiency of the motor and transmission, a run of 782.7 miles was made; 49 gallons 3 quarts of gasoline was consumed, making an average of 15.8 miles to the gallon. The last 210 miles of the road was in fairly good condition, and for this distance 9.8 gallons of gasoline was used, making an average of 21.5 miles per gallon.

Landaulets and Limousines are furnished and special cars to order of whatever motor-power, etc., that may be specified.

The illustration shows the new Type XII Limousine; price, $5,000 fully equipped. It has roomy double side entrances, and is upholstered and finished to specifications; accessories include speaking-tube to chauffeur, silk curtains, armrests and toilet cases; radiator in floor for heating purposes; all the windows in the body drop down, and are fitted with anti-rattling devices; it is lighted with 8-candle-power electric lamps; a lift third seat is fitted facing rear, to accommodate two grown persons.

The demand for this type Pope-Toledo, an exceptionally pretentious equipage for use in the country, as well as its town use, is becoming especially pronounced in the East.

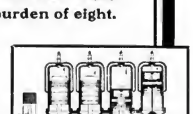
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The Two-Cycle ELMORE



Four cylinders constantly helping one another bear the burden of eight.



WITH four impulses every revolution, the two-cycle Elmore engine produces a power that can only be equalled in the four-cycle type by the use of eight cylinders. The application of power is always uniform; the force of one explosion impelling the piston half way through the cylinder when another begins.

NOTE.—Cylinder No. 1 shows the piston half way down. The piston of cylinder No. 2 is at this point starting down from another explosion. Before the force of the explosion on this piston is exhausted the third cylinder will come into action, then the fourth and then No. 1 again, as long as gas is fed into the cylinder and there is a spark to fire it.

THE SIMPLEST ENGINE IN THE WORLD

Actually fifty per cent. of the moving parts done away with. Up-keep reduced fully fifty per cent. Most successful self-starting engine made.

When you understand that the two-cycle Elmore engine does away with 18 to 20 parts on each cylinder, and absolutely eliminates all inlet and exhaust valves with their attendant mechanism, you'll agree with us that this is the simplest engine in the world. One, two or three cylinders may be cut out at will, both spark and gasoline. With one cylinder cut out the difference is imperceptible, except in speed; with two cut out—barely noticeable. Do you see the economy of this feature?

The fact is that there are so many mechanical advantages about the Two-Cycle Elmore that you should send for our catalogue and special literature, which explains everything fully.

ELMORE MFG. CO., Amanda St., Clyde, Ohio

Members Association Licensed Automobile Manufacturers.



AN EQUATION

Superior Material, Superior Facilities, Superior Mechanics } + { Intelligent Engineering, Thorough Testing, Attention to Detail } = A PERFECTED CAR

THE PREMIER

"The Quality Car" Air Cooled

The above equation is just as simple, just as logical, and just as inevitable as that

$$2 + 2 = 4,$$

and it is especially applicable to the Premier. We have devoted years to the production of one model of motor—the vital part of a car—and it remains yet to be improved by others: *there is no other so successful* and satisfactory motor of its type.

Our pressed steel frame, I-beam front axle of great strength, 20-24 M.P. motor, selective type sliding gear transmission (three speeds forward and reverse), beautiful and luxurious body, on full elliptic springs, positive irreversible steering gear—all characteristic Premier features, will commend the car to you.

Send for our Catalogue and Booklet R

PREMIER MOTOR MANUFACTURING COMPANY

Members American Motor Car Mfrs. Assn. INDIANAPOLIS, INDIANA, U. S. A.

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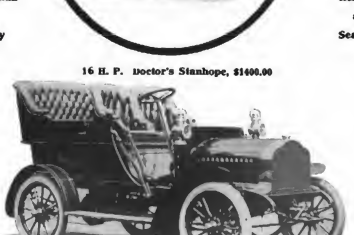
Compound

As Good as the Best Better than the Majority



Economical and Absolutely Reliable at all Seasons

16 H. P. Doctor's Stanhope, $1400.00



16 H. P. Light Touring Car, $1400.00

Duplicate of Winner in New York Motor Club's National Economy Test

E. H. V. CO. : Middletown, Conn.

If You Want to Buy a Car

¶ State whether you want gasolene, steam or electric. Whether the car is to be used on city roads or for touring purposes. State also about what price you are willing to pay.

¶ Send the above particulars with $1 and we will quote to you what cars we have on our list that come nearest to suiting you.

MOTOR, 1789 Broadway, N. Y.

For advertisements received too late for classification see the last five advertising pages.

HERZ MOTOWHISTLE

HERZ & CO., of New York City, manufacture a Motowhistle, a specially constructed petticoat double chime whistle with adjustable mantle permitting to set the tone to any desired color. The whistle's mouth is closed by a spring valve with a long lever which may be actuated by a cord or wire. The tone produced is rich and deep in color and easily heard over the longest distance. The Motowhistle may be directly connected to the exhaust of the motor or preferably attached to the whistle tank, which is round, made out of seamless bronze tubing, 6 inches in diameter and 18-24 inches long. One flat end of the tank connects to the pipe or rubber tube coming from the exhaust or from the pump.

The tank opening is automatically closed against the back pressure by an automatic check valve which will prevent the tank from losing its pressure.

The tanks are tested for a pressure of 120 pounds per square inch and a specially constructed safety valve will release automatically any higher pressure, and thus exclude all danger. The tank may be fed by the exhaust of the motor by connecting same by tight fitting tubes to the exhaust piping, or tank and whistle may be used in connection with their B. B. pump.

The Motowhistle may be used either for motor cars or motor boats. For the motor car outfit, a second outlet is provided which may be used to pump up the tires. A regular horn instead of the whistle may be connected to the tank.

The Herz B. B. double piston pump of elaborate design is used for many purposes:

To pump up the tires of an automobile to the desired predetermined pressure; to pump up the pressure tank on a motor boat; to blow the horn or the whistle; to put pressure on the gasoline tank. Everywhere, at home or on the road, where pressure up to 60 pounds is needed.

The pump is constructed on the lines of a small gasoline engine. Two vertical cylinders are cast together and a double-throw forged steel crank drives two pistons ground tightly into the cylinders.

Each cylinder has its intake and delivery valve, and each is contained within a housing which screws into the cylinder head.

A safety valve is placed back of and between the exhaust valves, so that it is impossible to pump up more than a certain predetermined pressure, which may be any pressure up to 50 pounds per square inch.

The pump may be attached to the motor and driven by chain, gear, or belt, or a special handle to pump by hand. Its height is 9 inches, its weight, 7 pounds.

A TEMPERED SPRING.

THE National Cutlery Company, of Detroit, Michigan, provide a tempered spring so construcuted on a truss rod frame that it cannot slip from its original position; and the facilities which this company have for tempering, make it possible for them to furnish these springs tempered, at a price which will compete with ordinary untempered springs.

The temper of all the springs is absolutely uniform on account of the special process which they use. This tempering produces a spring which will not "set" no matter how constantly it is used, and as each spring is, by its own construction, locked into the truss rod frame, it acts independently of the others, and cannot slip from its original position.

These truss rods are built of corrugated steel, making the construction very light and very strong as well as durable.



AUSTIN INLET VALVES.

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ESTABLISHED 1896



Grout Gasoline Car

Price, $2,500

30-35 H. P. Including Top, Two Headlights, Two Oil Lamps, Horn, Tools and Tire Repair Kit.

SEND FOR CATALOGUE

GROUT BROTHERS AUTOMOBILE COMPANY

MAIN OFFICE AND WORKS: ORANGE, MASS., U. S. A.

Agencies

MUNSING & CHAPMAN, 1855 Broadway, New York.

A. T. WILSON, 1558 Broadway, Denver, Col.

L. D. TAYLOR, Brattleboro, Vt.

20th CENTURY MOTOR CAR CO., 1421 Michigan Avenue, Chicago, Ill.

WHITNEY & CONVERSE, Winchendon, Mass.

GROUT BROTHERS AUTOMOBILE COMPANY, H. W. Lansing, Manager, 311 Third Street, South, Minneapolis, Minn.

J. A. PETREE, New Haven, Conn.

CURTIS HAWKINS CO., Motor Mart, Boston, Mass.

H. K. DODGE, Glen Cove, N. Y.

P. H. JOHNSTON CO., 267 Halsey St., Newark, N. J.

National

Reliability and Endurance

Were demonstrated in a convincing way on Nov. 16-17th at Indianapolis when a National Stripped Stock Car made

1094 3-16 Miles in 24 Hours

Breaking the World's Record by 78 9-16 Miles







Model D, 4 Cylinder, 35-40 H. P. **$3,000**
THE CAR THAT BROKE THE WORLD'S RECORDS

WRITE FOR FULL DETAILS

Model E, 6 Cylinder, 50-60 H. P. **$4,000**
AN INNOVATION IN TOURING CARS

NATIONAL DISTRIBUTORS.

Lincott Motor Co., 163 Columbus Ave., Boston, Mass.
Homan & Schulz Co., 134 W. 38th St., New York City.
Ralph Temple Auto Co., 312 Michigan Ave., Chicago.
Tioga Auto Co., Broad and Tioga Sts., Philadelphia.
Liberty Auto Co., 138 Beatty St., E. E., Pittsburg, Pa.
National Motor Car Agency, Los Angeles, Cal.
Colonial Auto Co., 3924 Olive St., St. Louis, Mo.
McKinley Motor Car Co., Rochester, N. Y.
Fisher Auto Co., Indianapolis, Ind.
Reiss, F. Beda & Co., Columbus, O.
Faukes Auto Co., Minneapolis, Minn.
Independent Auto Co., New Orleans, La.
Raig Auto & Garage Co., San Francisco, Cal.

NATIONAL MOTOR VEHICLE CO.

1004 EAST 22d STREET **INDIANAPOLIS, IND.**

(Member American Motor Car Manufacturers' Association, Chicago)

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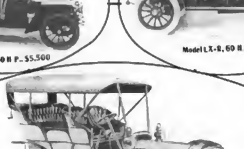
AUSTIN



Model LX-1, 60 H P.-$5,500



Model LX-B, 60 H.P. $4,100



Model XL-T, 60 H.P. $4,500

THE INDIVIDUALITY OF THE AUSTIN

Attracted thousands of Automobile enthusiasts at the New York and Chicago Shows. The characteristic features of the *Austin* brought out much favorable comment.

The different *Austin* models were designed by Mr. Walter Austin, who has made Automobile construction a study for many years.

Every car is constructed under *his* personal supervision. This feature is *sufficient guarantee* that the Austin is, in every particular, as near perfect as an automobile can possibly be made.

Our different models have all the *most desirable* features of the best foreign makes, combined with the *high clearance* and *strength* of all parts necessary for American road conditions—the *simplicity* of *detail* and *reliability* and ease of control, *demanded* by those who may wish to care for or operate their own cars.

The Motor is four-cylinder high compression, 5½-inch bore and stroke which develops its rated H.P. at 1,200 revolutions, but it can be speeded up to 1,500 or down to 120 revolutions on the direct drive. This is a very wide range of action for so large an engine. It is made possible by the large exhaust ports and the *Austin triple inlet valve*.

Our catalogue contains full details.

AUSTIN AUTOMOBILE CO.

38-96 SOUTH DIVISION STREET, GRAND RAPIDS, MICH.
NEW YORK AGENT: S. A. SANFORD, 1843 BROADWAY, NEW YORK

Wide, Roomy Tonneau



No Side Levers

The Silent Northern Touring Car

20 h. p., double opposed motor, four inch tires. Completely equipped, $1600 f. o. b. Detroit

NORTHERN

"The silent, dustless car"

Best for City driving or Country touring. The three-point motor support preserves absolute alignment of mechanism regardless of rough roads and the four full elliptic springs, four-inch tires, and 106 inch wheel base insure comfortable, easy riding with least wear on tires. All mechanism encased, no side levers, no belts, no chains, nor gaskets. No strut rods, nor truss rods—but you should have a copy of Catalog No. 13—Write for it today.

1906 Models:

Model Northern Runabout, 7 h. p., with oil lamp equipment,	$650
Silent Northern Touring Car, 20 h. p., double opposed motor, with gas and oil lamp equipment,	1600
Model K, 30 h. p. four-cylinder car, with gas and oil lamp equipment,	2800
Model K, 30 h. p. four-cylinder car, air cushioned and tire brakes, with gas and oil lamp equipment,	3000

Member Association of Licensed Automobile Manufacturers.

Northern Manufacturing Co., Detroit, U. S. A.

THE TRICAR.

As numerous specimens of the tricar appeared at the Paris Salon and two at the New York Shows, it is of interest to have a few words to say about it. To begin, then, motor-car artillery has recently been enriched with a new apparatus. It is France that conceived it, and England that gave birth to it and baptized it with its strange name.

France had triears in 1896 in the form of long, two-passenger tricycles, constructed by M. Leon Rollee. But the somewhat fragile structure of these apparatuses, created at the epoch of the first tentatives in motoring, caused their disappearance while yet of tender age; so that when England last year presented them to us again in new habiliments, we had great difficulty at first in recognizing them as French. The tricar is the product of the *entente cordiale*.

What is the idea to which the tricar corresponds? The tricar corresponds to the simplest of ideas, and that is this: each of us does not possess the $3,750 to spend for a motor-car, and yet each of us would like to own one. Now, the tricar is the motor-car of the family, which is always aware of the limits of its income; the motor-car of the people, who do not wish to fall into the hands of the mechanic (perhaps a bad one), and who cannot afford to spend $2 for gasoline and $60 for pneumatic tires in order to go from Paris to Rouen to dine, or who wish a small and cheap delivery vehicle, easy of management and simple of maintenance; or, again, the motor-car of the rich who desire to have at the mansion a pony motor-car always ready for a run.

It may be conceived that in order to obtain a motor-car of good quality at a price that may be considered as "popular," it is necessary to make concessions and leave exigencies at the door of the manufacturer.

In the first place, the tricar cannot, or, better, ought not to carry but two persons. The person in front is seated, and the one behind rides astride and steers. It is by no means a vehicle for parties of two men and two women and for picnics.

In the second place, the tricar is not a vehicle designed to beat Thery upon the Auvergne circuit. The speeds made with the tricar are those of the head of a family, not aged ones, of course, but one of from 40 to 45. It is because the power of a motor almost always corresponds proportionally to the quantity of gasoline, oil and rubber (in the form of tires) that it absorbs per second, that it has been necessary to give the tricars very small stomachs. Their motors, as a general thing, do not exceed 3 motor power, and consume from six to eight quarts of gasoline in order to cover 60 miles.

Finally, in order to produce a very strong two-passenger vehicle of small weight (330 or 440 pounds), the manufacturers have had to simplify the mechanism as much as possible. Those acquainted with the motor-car will at once understand that if the propulsion of the vehicle is done by a simple wheel, the hind one, it is because the abolition of the differential (a costly, heavy and fragile member), necessitated it. For a like reason, a tricar has generally two speeds ahead, but no reverse.

It is precisely in this extreme simplification of the mechanism, which could not exist in a carriage properly so called, that resides the charm and convenience of the tricar.

The charm, because the parts being very few, the causes of break downs are also few, since the driver's attention is not absorbed in watching such parts.

The convenience, because the maintenance being almost null, the rider gets astride of his beast in the very clothes he has on, the bottom of his trousers rolled up solely.

It is the motor-car of the young who travel in pairs, more taken up with them selves than with the vehicle. It is the delivery wagon of

(*Continued on page 104.*)

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HAYNES A Car of Style

The body used on Models "O" and "R"—1906 Haynes was designed by a famous Parisian bodymaker. When the two cars were in New York, Boston and Philadelphia, last fall, they were frequently mistaken for foreign-built machines.

The only two models offered for this year have all the little details that add so much to beauty, convenience and luxury. Nothing is found wanting. The lines are graceful and the finish is as rich as it is possible to produce.

But in addition to being a car of great beauty, it is also a car of great comfort, endurance and reliability. It is as dependable as the old family horse, rarely out of order and always easy to manage.

Haynes care in construction, in selection of materials and finish, is responsible for this and make it the car of small cost for repairs and up-keep. These points will be proved by demonstration by any agent handling the Haynes. Send for new catalogue. For prompt attention address Desk 6.

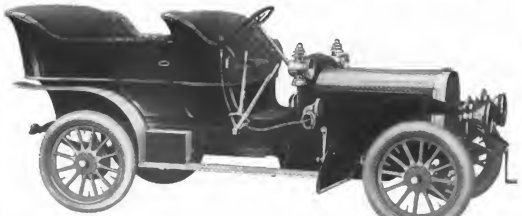
THE HAYNES AUTOMOBILE CO., (*Oldest Automobile Manufacturers in America*) **Kokomo, Ind.**

New York, 1715 Broadway — Members A. L. A. M. — Chicago, 1420 Michigan Avenue

"The Car the Repairman Seldom Sees"

Model "R" Four-Cylinder Touring Car

Vertical roller-bearing engines. Cylinders cast separately, 5¼x6 inches, 30 H.P. An exclusive transmission that absolutely prevents stripping of gears. Positive cooling system. Individual and special lubrication. Master Clutch has metal faces and takes hold without jerking. Shaft drive. Exclusive universal joints that prevent wear on pins. Sprocket and Roller Pinion and perfect Rear Axle, all exclusive. Roller bearings throughout. 108-inch wheel base, 54-inch tonneau, seating five people. Four to 60 miles an hour on high gear. Weight, 2,750 lbs. Price, $3,500 f. o. b., Kokomo. Full equipment.



SCIENTIFIC and SUPERIOR AUTOMOBILE CONSTRUCTION

All that is best in up-to-date Automobile Engineering is found in the

Four-Cylinder Waterless KNOX

EXAMINE the Waterless Cooling System which is also "Troubleless," the metal to metal cone clutch running in oil, the four speed sliding gear transmission with quiet change mechanism, the simple, scientific and sure oiling system, the high grade materials, and see if this car is not a year or two ahead of all others in its mechanism as well as in

STYLE AND COMFORT

Write for catalogue of pleasure cars, also commercial cars



35-40 H. P.

Tonneau, capacity 7 persons, - - - - - - - $4000.00

Limousine, capacity 6 persons, - - - - - - - $5000.00

KNOX AUTOMOBILE COMPANY, SPRINGFIELD, MASS.

Members A. L. A. M

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JACKSON



COMPARE THE PRICE
of the JACKSON

with the design, material and workmanship that enter into the construction of each Jackson model, and you will note that we are giving better value for the same money than any other automobile on the market.

So eager have well informed agents throughout the country been to secure the agency for the Jackson, that were we equipped to build three times the number of cars our present capacity can provide, we could have sold them at the New York and Chicago Shows.

The average automobile agent is a keen observer and knows a good thing when he sees it.

We prove all our claims. Get our 1906 catalogue.

JACKSON AUTOMOBILE COMPANY
South Park Avenue .·. JACKSON, MICHIGAN

1906 Motor Car Directory

CLOTH BOUND
$1.00 PER COPY

MOTOR, 1789 Broadway, NEW YORK

THE "VALVELESS WONDER" FOR AUTOMOBILE LUBRICATION

The only pump on the market which will pump against any pressure whatever. Manufactured in any number of feeds and results adopted to any automobile on the market. Write for circulars.

MADISON-KIPP LUBRICATOR CO.
MADISON, WIS., U. S. A.
LOS ANGELES AGENTS Richardson & Pratson
SAN FRANCISCO AGENTS Geo. P. Boore & Co.

FOR SALE.

IMPORTED RENAULT CAR.

14 H.P., Landaulet; also equipped with extra open body. In first-class condition. A quiet, reliable car, handsomely fitted up. Price, $3,500. Address TOWN, care of Motor, 1789 Broadway, New York City.

For advertisements received too late for classification see the last five advertising pages.

the modern business man who has no time to waste in order to serve his customers.

The number of tricars in England is fabulously large. In France, manufacturers have for a few months been awake to the idea of the popular motor-car and have produced some apparatuses that are claimed to be in some respects superior to those of English make. The French tricar is distinguished by the purity of its lines and the ingenious and logical arrangement of its parts.

The motor generally does not exceed 3 M. P. We despair of soon seeing tricars of 6 or even 8 M. P. When the day comes, if manufacturers of tricars do not violently rebel against the insane demands for monstrous power, the tricar will have conquered—just as the gasoline tricycle of delightful memory conquered when it was actuated by a 1¾ M. P. motor (of so odious memory), when it was provided with a 5 M. P. motor. Its motor may kill it. The future of the tricar is therefore in the hands of manufacturers as much as it is in those of the public.

To sum up. The tricars may be defined as three-wheeled motorcycles. They have over the latter the advantage of being stable upon all kinds of ground, and that of offering a much greater carrying capacity—qualities which adapt them to the use of business men.

A MASSACHUSETTS SPEED LAW RULING.

Judge Gaskill, of the Massachusetts Superior Court, has lately made a ruling of much interest and importance to the owners of motor-cars. Some of the local district courts, sharing, it would seem, the spirit of animosity shown in many of the prosecutions for "speeding," have found the owners guilty regardless of the question whether the car was at the time being run by its owner or was under his control. The case, in which Judge Gaskill overrules this irrational doctrine, is worthy of notice. Mr. Edward W. Taylor, of Lexington, son of the chairman of the board of selectmen of that town, operated a line of "sight-seeing" (Knox) cars between Arlington Heights and Concord, passing through Lexington and along the historic Paul Revere route. On the occasion of the very last trip made, on the last day of the season, the authorities of Lincoln (through a remote corner of which town the route lay) laid in ambush alongside a measured course, three hundred and thirty *feet* in length, and timed the car. A fraction in excess of 19 miles was the speed alleged to have been made over this extended (sic) course on the up trip, and a little more than 22 miles an hour, on the return. In the district court at Concord, it was shown that the defendant, Mr. Taylor, the registered owner of the car, was not with it at the time complained of, but was in a neighboring town. The car was being operated by one of his employees, who held an operator's license. The venerable judge of that court promptly held that these facts constituted no defence, and proceeded to impose the maximum fine (this being the defendant's first offence) of twenty-five dollars on each count, or fifty dollars in all. The case was as promptly appealed by Mr. Taylor's counsel, and on December 15, in the Superior Court, the defendant was duly acquitted, the jury giving their verdict, in obedience to Judge Gaskill's ruling, that on the facts the owner had committed no offence. The Judge said that the owner of a motor-car, if present in the car when it is run in excess of the speed limit *may be* held to be the guilty party, notwithstanding the fact that the machine is being operated by his chauffeur; but that to hold the owner responsible, though absent at the time and not shown to have instructed or authorized the chauffeur to run fast, would be utterly subversive of the fundamental principles of the criminal law. "As well," he said, "might an owner under such circumstances be held for manslaughter, if the chauffeur wantonly ran over and killed a person in the highway."

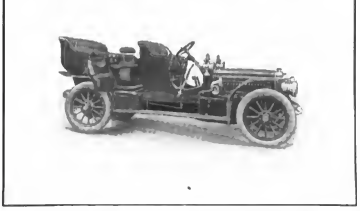
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EXAMINE THE THOMAS, FEATURE BY FEATURE

We do not offer you the 1906 Thomas simply on the strength of its supremacy among American cars. We ask you to consider it upon its ability to out-point in all around excellence and efficiency the finest car made anywhere in the world.
It will "stand up" under any and all conditions. It is staunch, strong, rugged, powerful and the most beautiful car in the world.

DEPENDABLE AND SAFE

You should be sure that the Car you buy has these two elements, upon which depends all the comfort and satisfaction in automobiling. The two words, DEPENDABLE and SAFE, describe most accurately the four separate motors of THE 1906 50 H.P. THOMAS FLYER.



The practical use of many superior mechanical features has given the New Thomas Flyer a distinctive prominence throughout the automobile world. The strength of its motor construction has added RELIABILITY to the world-wide reputation as the fastest and most powerful car in the world.

MOTOR CONSTRUCTION

The four separate cylinders are made of a special grade of close-grained iron. Both inlet and exhaust valves are mechanically operated, located on opposite sides of the motor. All valves are interchangeable. The cylinders being separate enable you to climb the steepest grades, or travel on the most crowded streets without change of gear. In describing the Thomas Motor we will only touch on the points which are of vital importance for motor perfection.
Cylinders 5½ x 5½ inches and develop 50 h.p. They have forged nickel-steel connecting rods with five large bearings. The cam gears for operating all the valves are of the combination type, with wide face and coarse pitch, thus making them strong and noiseless. There is no satisfaction to the motorist like that of knowing the engine is reliable, and there is even a greater satisfaction in the knowledge that every special feature of the New Thomas is absolutely essential to comfort and happiness.
We have already brought to your attention the Thomas Safety Device, which positively renders accidents from backing an impossibility.

The 50 Horsepower Thomas Flyer

has many new improvements that are so essential to comfort and satisfaction in motoring, that it is only possible to point out a few of these mechanical advantages at a time.

Watch our coming announcements in this magazine, in which will be described in detail:

The most effective metallic three-disc clutch in operation.
Gears that may be changed between high and low without passing through intermediate gears.
Hill climbing—will carry five passengers up a 14 per cent. grade on high speed at the rate of 40 miles an hour.
Practical use of Chain Drive.
New dustless body—dust suction entirely eliminated.
A guaranteed speed of from 10 to 60 miles per hour on the high gear, always running quietly, smoothly, without rock or jar.

In order that you may have a complete understanding of the All-American Car, which at last surpasses the finest Foreign Product, besides giving you a true and accurate description of many of its special features in this magazine every issue, we want to send you our illustrated catalogue and special Thomas literature.

THE E. R. THOMAS MOTOR COMPANY, Largest Manufacturers of 50 Horsepower Cars in the World. Members Association of Licensed Automobile Manufacturers. **1415 Niagara St., Buffalo, N. Y.**

Licensed under Selden Patent

40-45 H.P.
60-65 H.P.

"Matheson"

Weight 2900 and 3100 lbs.

Self-starting from the seat with make-and-break ignition.

Water-cooled Brakes



One Year Guarantee

Complete Catalogue mailed on request

THE MATHESON COMPANY OF NEW YORK, 1619 Broadway

FACTORY, WILKES-BARRE, PA. (Formerly of Hoboken, Mass.)

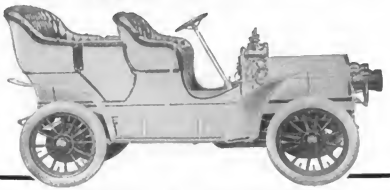
N.B.—The new MATHESON FACTORY is one of the LARGEST and MOST MODERN AUTOMOBILE PLANTS in the WORLD

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THE MARMON

"A Mechanical Masterpiece"



Twisting an Automobile

Get the details of this front view firmly in mind. Note that raising a rear wheel over a foot tilts the body frame but does not tilt the lower frame. (A front wheel raised reverses this condition.) Note that one wheel rests on the obstacle encountered, but that the other wheels rest solidly on the ground, adjusting themselves readily to any position the road may demand.



All country roads twist an automobile in this way—in small or large degree. Because of its flexible running gear, the Marmon endures this constant twisting *without strain.*

No other cars possesses any considerable amount of flexibility in its running gear. Tilting one axle tends to tilt the other, just as lifting one leg of a chair lifts one or two other legs. This twisting strain affects every part of the costly mechanism, and is aggravated by speed. The faulty principle is not corrected by any arrangement of springs nor by the use of flexible couplings or other weakening devices in the driving mechanism. Any such rigid construction is bound to react on both tires and passengers.

The Marmon possesses a luxury of motion and a freedom from road strain unknown in any other car, by reason of an exclusive patented feature,

Double Three-Point Suspension

Luxurious solid cast aluminum body on one frame, entire power plant on another frame, *each frame* suspended on three *pivotal* points. No matter what wheels are raised, no matter which frame is tilted, the power plant and rear axle are maintained in perfect alignment, free from twisting and binding strains. Simplifies the entire construction and means a minimum of wear. Permits the use of a rigid shaft drive (without flexible coupling) delivering a greater percentage of motor power to the wheels than is had in any other car.

Complete description in Booklet No. 4. Yours for the asking.

Four Cylinders. Air Cooled **Model C, 24 H. P., $2,500**
Perfect Lubrication **Model D, 30 H. P., $3,000**

Nordyke & Marmon Co., Indianapolis, Indiana

(Estab. 1851)

CHAUFFEURS CAN BEST FIND
A POSITION BY USING THE

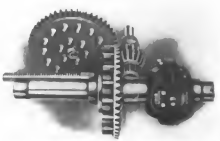
Chauffeurs' Registration Bureau

1789 BROADWAY

SEND STAMPS FOR PARTICULARS

BELDEN TRANSMISSION.

A NEW thing in transmission is the Belden device. It consists of two large gears having two-pitch teeth, which, it is well known, are eight times the strength of six-pitch teeth. The transmission has three or four speeds forward and one reverse, a



SHOWING THE BELDEN TRANSMISSION.

peculiarity of the drive being that it is always direct and that there is no need of perfect alignment.

In use none of the gears are running excepting the bevel gears, when on the high speed, and no gears are running while on the first, second, and reverse, excepting the one in use.

The makers claim for it the highest efficiency possible, saying that it delivers 92 per cent. of the power of the motor, that there is no loss from slippage at the time of the explosion, and no strain of gears to produce friction. The illustrations show the complete transmission and the bevel drive as it is used on the rear axle, including the differential. It has always been a question whether or not from 35 to 40 per cent. of the motor-power is lost in transmission when sliding gears are used as from 4 to 8 gears are always in mesh, and it is claimed that where a planetary system is used the loss is much greater excepting when it is driven on the high speed.

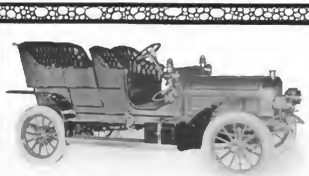


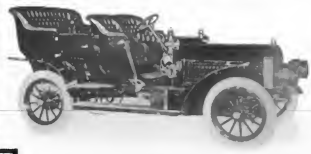
REAR VIEW OF CAR SHOWING THE BELDEN TRANSMISSION.



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DOLSON





A DEMONSTRATION

Will convince any automobilist of the *practicability* and *reliability* of the *Dolson Automobile* for every-day-in-the-year use. The *simplicity* of construction and ease of control has made the *Dolson* a car to be desired by those who prefer to operate and care for their own car.

The *Dolson* engine was designed by one of the *best engineers* the world has *ever* known, and it has been experimented with and tested until there is scarcely any room left for improvement.

Every part of the *Dolson* is constructed along lines that have been *thoroughly tested* and found perfect. Every part is made from the *very best material* procurable by *skilled mechanics*, who understand automobile construction.

We have *no apologies* to make for the *Dolson*.

We have agencies in *every part* of the United States, and are at all times pleased to demonstrate the *Dolson* for the benefit of those who contemplate purchasing a *high-grade Automobile*.

Arrange for a demonstration with our nearest agent.

MODEL F, 35-40 H. P.

BODY—Surrey type, full aluminum.
SEATING CAPACITY—Five persons.
FRAME—Pressed steel.
BRAKES—2 on hub, 1 on transmission.
TIRES—34 X 4.
CYLINDERS—4 vertical.
COOLING—Water.
IGNITION—Jump spark.
TRANSMISSION—Sliding gear.
SPEEDS—3 forward and reverse.
DRIVE—Shaft.
WHEEL BASE—110 inches.
TREAD—56 inches.
WEIGHT—2,250 pounds.

Full details sent on request.

DOLSON AUTOMOBILE CO. 117 Main Street, CHARLOTTE, MICH.

CHICAGO: Burnett-Bird Co., 1404 Michigan Ave.
BOSTON: Imperial Automobile Co., 1020 Boylston St.
SAN FRANCISCO: Largenaur Automobile Co., 1174 James Flood Bldg.
MT. VERNON, OHIO: R. E. Vail.

BAKER ELECTRICS

Comprise Seven Models for 1906

IMPERIALS STANHOPES SUBURBANS SURREYS
DEPOT CARRIAGES BROUGHAMS, (Exterior and Interior Driven)



In the manufacture of these beautiful vehicles we spare no expense, either in workmanship or quality of materials.

We have always aimed to make the name "*BAKER*" as applied to automobiles a synonym for highest excellence.

The long-continued, satisfactory service of thousands of BAKER ELECTRICS together with their superb finish and perfect running qualities has earned for them from admiring owners, the title,

THE ARISTOCRATS OF MOTORDOM.

The Stanhope illustrated is representative of the BAKER line. It is the ideal two-passenger vehicle for family use. The utmost simplicity of its operation makes it the safest of all automobiles for ladies to drive, yet its stamina and running qualities cannot fail to appeal to the man most experienced in the use of motor cars for business or pleasure.

BAKER ELECTRICS are clean and free from odor, superbly finished in every detail, simple in operation and absolutely unequalled for durability, and easy running.

Write for illustrated Catalogue.

THE BAKER MOTOR VEHICLE COMPANY

14 JESSIE STREET CLEVELAND, O.

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Soules



A Mad Rush:

Has been made by the average Automobile agent, up to the present time, to secure the agency for a pleasure vehicle,and they have neglected the Commercial branch of the business.

There is going to be keen competition among the pleasure vehicles this season, and it is not going to be as easy to sell pleasure vehicles as formerly.

The agent who includes a Commercial Vehicle in his outfit will find at the end of the season, that his aggregate sales have been larger than any previous year.

Our exhibit at the Chicago Automobile Show was well patronized, and was one of the chief features of the show.

There are still a few territories open, and we shall have pleasure in sending full particulars to any who desire to add a Commereial vehicle to their line.

Specifications:

PRICE—$1,800.
BODY—Open, with detachable top, or closed with wire side panels.
CAPACITY—2,000 lbs.
FRAME—Angle steel.
BRAKES—Internal and external rear hub.
TIRES—34 x 3, or 34 x 2½.
CYLINDERS—2, horizontal-opposed in front, 5¼ x 5.
COOLING—Water, thermo-siphon system.
IGNITION—Jump spark, double coil.
CLUTCH—Cone, leather faced.
TRANSMISSION—Sliding gear.
SPEEDS—2 forward and reverse.
DRIVE—Bevel gear.
WHEEL BASE—90 inches.
TREAD—56 inches.
WEIGHT—2,000 lbs.

SOULES MOTOR CAR COMPANY, Grand Rapids, Mich.

Sales Department and Show Room, 736 to 740 Woodward Ave., DETROIT, MICH.

WANTED

A MAN WITH A NEED

If you want to buy anything, if you want to sell anything, if you want a Chauffeur or Mecanicien, if you want anything in the world of motoring, you want

MOTOR MESSENGERS

A little "Want Advertisement" or MOTOR MESSENGER in the next issue of MOTOR will give results to fit your needs.

In a few words, write your "want" and mail it to MOTOR with the price of the MOTOR MESSENGER at

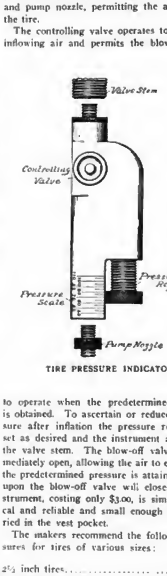
5 CENTS A WORD

TIRE PRESSURE INDICATOR.

OVER- and under-inflation and unequal pressures in the different tires of a motor-car will do more to destroy them than all the ordinary wear they are subjected to. A tire built to give the best results at 60 lbs. pressure should not be inflated to 80 lbs. pressure nor should it be operated at 50 lbs. pressure. Over-inflation and unequal pressures in the different tires subject a car to unnecessary jolting, jarring and strain. An extreme pressure also destroys the resiliency a pneumatic tire should give when passing over obstructions or inequalities in the road. Under-inflation is a common fault, and the damage to the tire is much more disastrous, because the weight of a car depresses an under-inflated tire so much that when it is driven into violent contact with obstructions, it is seriously damaged and oftimes destroyed. The Lock-Switch Mfg. Co., of New York, are now placing on the market an inexpensive little device designed to measure the exact pressure in a tire, whether applied after inflation or during inflation, and which enables the operator to determine the precise pressure the tires are to receive.

The illustration shows the exact size of the instrument and the position it is placed in when in operation. To obtain a desired pressure during inflation the pressure regulator is set, by the scale, to the pressure wanted, then placed in position between the valve stem and pump nozzle, permitting the air to enter the tire.

The controlling valve operates to check the inflowing air and permits the blow-off valve



TIRE PRESSURE INDICATOR.

to operate when the predetermined pressure is obtained. To ascertain or reduce the pressure after inflation the pressure regulator is set as desired and the instrument attached to the valve stem. The blow-off valve will immediately open, allowing the air to escape until the predetermined pressure is attained, whereupon the blow-off valve will close. The instrument, costing only $3.00, is simple, practical and reliable and small enough to be carried in the vest pocket.

The makers recommend the following pressures for tires of various sizes:

2½ inch tires	40 pounds
3 inch tires	45 pounds
3½ inch tires	55 pounds
4 inch tires	65 pounds
4½ inch tires	75 pounds
5 inch tires	85 pounds

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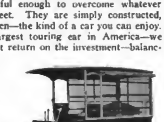
Logan

HORSE sense cuts as much of a figure in the automobile business as it does anywhere else. People don't go driving in brick wagons nor haul bricks in spring buggies.

All the LOGAN 1906 models are distinguished by their adaptability of construction. Every feature of each machine has been designed to meet the requirements of its particular use.

Our commercial cars are *not* built with a commercial body and a pleasure car chassis. Experience as well as common sense has shown us that the same type of construction is not satisfactory for both uses. We build our commercial cars for commercial work from the ground up,—heavier frames, axles, springs, wheels, lower gears and stronger parts throughout.

Our touring cars are built for real touring, bad roads and steep hills—heavy enough and powerful enough to overcome whatever conditions they are liable to meet. They are simply constructed, easily understood, and easily driven—the kind of a car you can enjoy. We do not aim to make the largest touring car in America—we want our car to make the biggest return on the investment—balancing the pleasure it gives against th cost, repairs, maintenance, and depreciation. We have figured these last items down to the minimum — the first depends upon you and the car.



Our smaller machines are air-cooled, since this method does away with much weight and extra parts. When we say air-cooled, we do not mean just the absence of a water cooling system — we mean really and scientifically cooled, inside as well as out. By special construction the air circulates freely throughout the crank case, cooling the pistons, bearings and inner walls of the cylinders. The outside is cooled by sheet-copper flanges fitted closely upon the cylinders, assisted by an eighteen-inch fan.

Our runabout is really a two-passenger touring car, as it will stand as hard service and go at as great a speed as a five-passenger car. It has a ninety-inch wheel base, full elliptic springs and is just as well built and finely finished as our larger cars.

Our commercial cars have large carrying spaces and are fitted with any kind of body to order. We also build a bus body to fit our large commercial chassis. These bodies can be built to carry from fourteen to twenty passengers and make an exceptionally good investment for the small amount of capital they require.



All our engines are two-cylinder opposed as that gives the same power with half the parts, half the bearings and wearing parts and half the likelihood of getting out of order.

Again, we repeat there is a reason for every part or point in the construction of the whole LOGAN line.

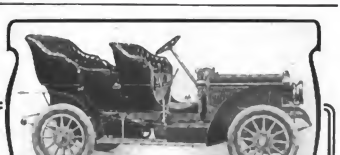
Write for our new Catalog E-3.

The Logan Construction Co.

CHILLICOTHE, OHIO.

NEW YORK: The Empire Auto Car Co., 266 W. 138th St.
WASHINGTON, D. C.: The Commercial Auto Supply Co., 715 13th St., N. W.

"That Car of Quality"



MODEL H
30 h. p. Touring Car, $2,500, f. o. b. Detroit (not including lamps)

Four-Cylinder Perfection

It is *concentration of effort* that has made the Cadillac what it is. For five years its makers—the master designers and motor builders of America—have focused their endeavors upon a single object—to produce a faultless motor car. A consummation of these efforts is found in the magnificent line of 1906 cars, notable among which are the four-cylinder types. These models embody every point of excellence thus far found in any of the high-priced cars, either of American or foreign make. When you remember the remarkable efficiency of the famous Cadillac single-cylinder engine, and consider this same principle embodied in quadruple form, you will gain a slight idea of the serviceableness of these powerful four-cylinder models of the

CADILLAC

Among the many improvements is an automatic governor which limits the speed of the engine when the latter is disconnected, eliminating vibration and saving much fuel and energy. Another is the mechanically operated oil feed (found on all Cadillac models) which supplies oil to the engine in accordance with its speed, keeping it always in a state of perfect lubrication. Transmission is of the exclusive Cadillac planetary type with specially cut and hardened gears. The bodies are of unusual elegance, and luxuriously appointed. Wheel base of model H (30 h. p.) 100 inches; Model L (40 h. p.) 110 inches. Practically noiseless; comfortable and easy-riding as a Pullman coach.

Let us send address of nearest dealer and our finely illustrated catalog S, which will tell you more about the 1906 Cadillacs. A car to suit any purse, any requirement.

Model L, 40 h. p. Runabout, -	**$750**
Model M, Light Touring Car, - -	**950**
Model H, 30 h. p. Touring Car, -	**2,500**
Model L, 40 h. p. Touring Car, -	**3,750**

ALL PRICES F. O. B. DETROIT

CADILLAC MOTOR CAR CO.

DETROIT, MICH.

Members Assn. Licensed Auto. Mfrs.

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REO Four-Seat Runabout, 8 h. p., 1000 pounds, 35 miles per hour. With folding seat to carry two extra passengers. $675.

REO

Honest Power Honest Price

Anyone can speed up a motor in the factory with a heavy fly-wheel so that for a period of ten seconds it will show a high brake horse-power; but that is a mere trick. It is no test. REO rating is not "faked" in that way. It is obtained by an actual ten-hour dynamo test. It is accurate; it is honest; and above all it is thoroughly proven by unquestioned performance.

It was a REO car that broke the middle-weight speed record, on the Syracuse race-track—beating a car of higher nominal rating; a REO car that lowered its class record 23 minutes in the "Climb to the Clouds" up Mt. Washington; a REO 16 horse-power car that won 3 cups in one day on Paddock Hill, Cincinnati—beating every one of the twenty 4-passenger gasoline cars that competed; eight of them being rated at "twenty-four" and costing twice the REO'S price.

Those were REO cars that captured the five first prizes—out of seven in all—in the National six day economy test; and it was the 8 horse-power 4-seat REO Runabout that carried 4 passengers cheaper per passenger than the big "twenties" could carry five.

The REO price is as honest as REO power. REO cars are the product of long and successful experience and practical sense. From the very first they were free from those costly errors which make a falsely high price and extravagant running expense.

Write for the REO book that tells why



REOGRAPH, showing the inside of a typical motor in actual moving operation, sent to you for six cents in stamps addressed to Dept. 120.

REO Touring Car, 15 h. p., three minute, 50-mile wheel base, 5 passengers, side door, detachable tonneau, speed 35 miles per hour. $1250.

REO Motor Car Co. **Sales Department, Lansing, Mich.**
R. E. OLDS, *President.* R. M. OWEN, *Manager.*
Agencies throughout the United States

1906 BRASIERS.

M.P.	Size of Cylinders.	Long Chassis.	Short Chassis.	Front Tires.	Rear Tires.
15—20	90 x 120	3.035	2.715	875 x 90	875 x 120
25—36	112 x 130	3.01	—	875 x 105	880 x 120
40—60	130 x 140	3.062	2.892	915 x 105	930 x 120

OWING to the fact that there has been an increase of taxes in Paris on the rating of cars, it is noticeable that these cars are very much underrated as to their cylinder size; the 15-20 actually brake 25 M. P., the 25-36, 40 M. P. and the 40-60, 75 M. P.

The 1906 motors have changed in some respects from those of 1905. Both the exhaust and admission valves are on the same side. This makes a very much better arrangement, is more accessible in every way, and looks less complicated than having a double set of piping on either side of the motor. As they never have any trouble of any description with the exhaust and admission valves, this will be seen to be an improvement.

The magneto is on the opposite side from the exhaust and is free and clear in an open space. The magneto gear is directly fastened to the magneto shaft, so that there are no auxiliary bearings to get out of line and give trouble.

The magneto is so arranged that one bolt takes it off, and this bolt is a thumb screw, so that the magneto may be removed in an instant and put back in five minutes. The advantage of being able to readily clean and adjust the magneto must be obvious.

The wire from the magneto comes up to a plug switch board on the inside of the dash and from there is distributed by plug switches both to the steering wheel, where the cut-out switch is located, and also to the buss bar on the motor. In case, for instance, a short circuit is found along the line of the steering wheel, it will simply be necessary to shift the plug on the inside board to make a direct connection from the magneto to the motor, and cut out all of the auxiliary wiring.

The oiling device is quite new, the same form of oiler is retained in principle, made by the same concern; but in view of the fact that it becomes a penal offence in France for a motor-car to smoke, and, as they arrest everybody who has a smoky car, a new oiler has been devised which will be used only on the Brasier. By throwing over a little lever which cuts the oil down to such a point that it will not smoke, but as soon as one gets out in the country, you simply throw over the little lever on the oiler, and then you have a full supply of oil, which is required when working the motor very hard.

The same dust-laying device is retained this year as for the past two years. In this connection we might say that their patent has been infringed upon in Paris, that they have brought suit and won in the courts. The Truffault Suspension will be used on the car this year as it was last year.

The governing of the motor is quite changed. The butterfly valves are removed from the cylinders and in their place a piston valve is put in the carburetor. This piston valve gives no trouble whatsoever and is free from wear.

The carburetor has an absolutely automatic air intake and is so perfect in its operation that the motor will stand and operate at about 150 turns a minute for hours at a time, and then by simply pressing the accelerator the driver can get maximum speed just as if he were opening a steam throttle valve, and the motor will not give a particle of smoke. By taking the hand off the accelerator it will come down to 150 turns a minute every time without a hitch. Another feature of this carbureter is that the motor runs absolutely steady at any speed desired. There is no hitching of the motor whatsoever.

The weight of the cars has also been somewhat increased. The 15-20, which corresponds with the 24 M. P. car, is about 5 per cent. heavier than the 24 M. P. This increased weight is in the rear axle and also in the increased size of the tires, and springs.

Another device which is entirely new and which will be applicable only to the 15-20 M. P. car, is an auxiliary gear box which is bolted right onto the frame, and which is at-

The Duquesne
STARTS FROM THE SEAT
Let us tell you about the other things characteristic of the Duquesne
WRITE US FOR DETAILS
DUQUESNE CONSTRUCTION CO., Jamestown, N. Y.

FORD Six Cylinder Touring Car **$2,500**
The Car of Surplus Power

"GALLIA"
Electric Carriages
Barnard Maurice Dufresne Count Armand de Gontaut Biron
52-154 West Thirty-eighth Street New York City

MOORE AUTOMOBILE COMPANY
571 Fifth Ave. New York

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THE LOZIER LINE



BOOK TWENTY-TWO describes briefly the general construction of LOZIER Motor Cars, the line for 1906 being covered in the following three sizes: Type C, 35 H.P. Type D, 40 H.P., and Type E, 60 H.P. Prices, $4,500 to $8,000.



BOOK EIGHTEEN tells of LOZIER Motor Boats and our methods of building. The increasing demand from year to year warrants our building stock sizes in larger quantities for 1906 than ever before. These include the special 20-foot 3 H.P. Open Boat, of which so many were sold last season—and the regular 21-ft., 3 H.P. and 26-ft. 5 H.P. Open Boats, at respectively $600 and $800. A fine line for selection.



BOOK TWENTY-ONE treats of our very complete line of Two-cycle and Four-cycle Marine Motors. The Two-cycle line embraces 3, 5 and 7½ H.P. sizes in single-cylinder, and 10 and 15 H.P. sizes in double-cylinder. The Regular Four-cycle line is in 20 H.P., two-cylinder, and 40 and 55 H.P., four-cylinder. Our Special light-weight 25 H.P. Four-cycle motor weighs complete with clutch and bed-plate only 775 pounds.

If you are interested send for the above catalogues. The LOZIER product in each of the lines represented is acknowledgedly of the highest grade, the same careful construction being followed in all our departments.

THE LOZIER MOTOR COMPANY

Fifty-fifth St. and Broadway, New York City

Western Selling Agents for Motor Boats and Marine Motors, DAN R. BOUTELLE, 1408 Michigan Avenue, Chicago. BOUTELLE BROTHERS, Ltd., Toronto, Ontario, Motor Boat and Marine Motor Agents for the Province of Ontario, Canada.

Stevens-Duryea

FOUR-CYLINDER, TWENTY HORSE-POWER

Touring Car

PRICE, $2,500



LIMOUSINE MODEL, Price $3,300.00

Repairs.—You can't tell us that it doesn't disturb your peace of mind a lot to find a repair bill in your mail every few days—don't you get to hate the sight of the repair man's name on the envelope?

It isn't entirely the cost of the tires or the repairs, either—it's the doubt as to whether you can plan a trip now for some day next week with any certainty that your car won't be in the repair shop at that time; or, if not this, it's the ever-present question as to how many hours or minutes earlier you ought to start in order to allow for potential tire and mechanical troubles,—it's this uncertainty, this lack of confidence, that destroys your peace of mind.

THE CERTAINTY OF OPERATION OF THE STEVENS-DURYEA results from a new method of construction which is thoroughly explained in our booklet. Send for it.

Let us emphasize the statement that it is a better design, with better material and workmanship that makes the Stevens-Duryea what it is.

J. STEVENS ARMS AND TOOL COMPANY

712 Main Street

CHICOPEE FALLS, MASS., U. S. A.

Members Association Licensed Automobile Manufacturers.

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Peerless



If we took only one point of construction at a time to show you wherein

Peerless Direct Drive Motor Cars

absolutely excel every other high-grade American and foreign car on the market and described that point intelligently in a magazine advertisement, it would take us so many months to enumerate them all that you might never get to the last one. So instead, we ask you to

Send for Our 1906 Catalogue

It illustrates and explains the Peerless features, and gives you all the points of superiority you could ask. Better still, see the car, examine it yourself, and compare it with every other car made. *Then* you'll know. To that end, we will gladly send you, with the catalogue, a letter of introduction to the Peerless dealer near you.

THE PEERLESS MOTOR CAR CO. 42 Lisbon St., Cleveland, Ohio
Member A. L. A. M.

FOR SALE

IMPORTED RENAULT CAR

14 H. P. Landaulet; also equipped with extra open body. In first-class condition. A quiet, reliable car, handsomely fitted up. Price $3,500.

Address TOWN, care of "Motor,"
1789 BROADWAY, NEW YORK CITY

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(*Continued from page 110.*)

tached by about an hour's work. This gives eight speeds. In other words, the gear box may be completely thrown in or out of service and nothing whatsoever moves in the box except one shaft that goes right through it. When it is desirable to run on the high gear all the time, simply throw the small lever on the side of the car which throws into mesh the auxiliary gear box. This gives a range of about one-half the speed of the original range of four gears. In other words, the high gear instead of being fifty miles an hour, then becomes twenty-five and all the other gears in proportion. Out into the country, simply throw the lever over, and at once the original four gears are just as ordinarily. This extra gear box will be sold at an additional price. It may be applied by any mechanic in about one hour's time and when it is in place it may be removed at any time that is desired, without injuring or changing the original efficiency of the car in any way.

All the springs have been lengthened, widened, and greatly strengthened.

The 20 M. P. car is the only bevel-gear driven car they will sell for 1906. The 30 and 60 M. P. cars are both chain driven.

MORGAN CARBURETER.

The carbureter manufactured by B. Morgan, John Street, Newport, R. I., is of the type in which the float chamber surrounds the mixing chamber, the spraying nozzle being in the center of the system so that the height of gasoline in the nozzle is unaffected by changes of level, whether the car is running up or down hill, or is, for any reason, tilted sideways. The float is of horseshoe shape and partly surrounds the mixing chamber; it is hinged at the rear end and an arm, extending back of the hinge, acts on the stem of the gasoline inlet valve. The various parts and their functions are indicated in the drawing. An advantage of this carbureter is that the piston throttle valve, which in the engraving is shown on the top of the carbureter, may be placed in almost any position to suit the motor and the space available. For instance, the throttle may be placed on top with its rod vertical; on the side of the carbureter, with the rod horizontal or vertical, pointing in any direction. Adjustments are provided for the hot air supply, and cold air supply, the height of the spray nozzle and the main air supply. The gasoline valve can be ground in position. The carbureter may be attached, by screwing to the pipe, by a half union or by flange. A boss is cast on the body so that it can be attached to a bracket.

MOTOR MODE MATERIALS.

One sees a quantity of checks and attractive plaids in silk rubbers, with a wide range of new solid shades in both coat and in grifonette. This latter material is claimed to be wind as well as rainproof, a very desirable quality for motoring. This latter cloth is often lined with a plaid silk, when the cloth in itself is on the darker coloring, and with a plain surface, the plaid piping the several seams and appearing in narrow folds upon collar and cuff as well.

One point that should not fail of notice is the constantly growing demand for both brightand soft colors in motoring garments. The dull and generally unbecoming leather shades that have prevailed for so long receive but scant attention nowadays. Several of the rose and red shades, pretty greens, pastel blues, all of the violet tones, and the dusty miller grays, are what modish folk are ordering. Even in the livery of the chauffeurs, this liking for colors is prominent; a house that makes a specialty of this branch declares that dark greens, clarets, and a dense smoke gray are ordered to-day, whereas formerly seal brown, dark navy, or black was the rule. * * *

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WE ARE SELLING THE CAR
The ROYAL TOURIST

We are selling an exact duplicate of the car that somersaulted and finished third in the Vanderbilt Elimination Race.

We are selling the car in which fouled spark plugs are never found.

We are selling the car that costs less money for repairs than any motor car, big or little, built anywhere.

We are selling the Royal Tourist. We sold more cars at the New York Show than any other similar make, including a sale of $30,000.00 worth to one family.

ROYAL

Forty H. P. **$3,500.00**

The Royal Motor Car Co.

CLEVELAND, O.

AGENTS.—C. A. Duerr & Co., New York. The McDuffee Automobile Co., Chicago. G. J. Dunham, Boston. G. W. Caplin, Minneapolis. Automobile & Supply Co., Lim., Toronto. Motor Shop, Philadelphia. Keyburn Motor Car Co., St. Louis. Standard Automobile Co., Pittsburg. Amos Pierce Auto Co., Syracuse. Schoeffel Co., Rochester. Royal Motor Car Agency, San Francisco. Member A. L. A. M.

The Rapid
MOTOR VEHICLE CO.

We deliver the goods



HERE IS A CAR THAT IS NEEDED AT EVERY CLUB, HOTEL OR COUNTRY PLACE

One 30 passenger car is all it will be found but the thing as a rapid, comfortable and economical way of effecting transportation to a party of 1 or, horse, and comfort places. It also a broad line more for eight passenger parties, and as a means of rapid, quiet but most interesting and comfortable

PRICE, $2,200 EVERY CAR GUARANTEED FOR ONE YEAR

We want to hear from their car to seat 12 passengers, price $1,600.

Do not run a car over one year but be supported to allow room for extra baggage.

We also make a full line of delivery cars and trucks.

For full particulars address **C. N. HENRY, Sales Manager**

RAPID MOTOR VEHICLE CO., PONTIAC, MICH.

WALKER



MODEL B

Price, $600.

¶ **The 1906 Runabout** is offered to the public as a car capable of carrying two passengers; artistic in appearance and up-to-date in construction and design.

¶ While this is our first season with this style of car we have had years of experience in the construction of gasoline motors and can frankly say that no machine of this class has fewer parts.

¶ We want live agents in every part of the United States

¶ Send for our agents' proposition and full descriptive matter.

WALKER MOTOR CAR CO.

109 Fort Street, Detroit, Mich.

De Dietrich Import Co.



The acknowledged premier of French cars. Direct representatives of Societe Lorraine des Anciens Etablissements De Dietrich & Cie. de Luneville. :: ::

De Dietrich Import Co.

No. 3 WEST 44th ST.

Opposite Sherry's

Licensed importers under Selden patent No. 549,160.

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The Stearns Finish

One Model 45 Horse Power

Only the quality of brains and material with the kind of workmanship, makes motor cars different.

The kind of brains in the Stearns has refined accepted practice—made one part serve the purpose of two, three or more—simplified the whole machine. The material in the Stearns has been brought from every corner of the earth where the best can be found.

The workmanship is that of the acknowledged kings of all mechanics—Americans, and the time and care they spend on each Stearns car is greater than is put on any other touring car in the world—10 months of 8 hour working days on each car (aggregate) for finishing alone.

By what process could any maker, anywhere, produce a better car? Where is another so made?

We invite comparison with the best products of all countries, confident that the more closely you examine, the more you will want a Stearns

After producing this car we figured the cost and selling price. We were pleased to find that the duties and excessive commissions on our only competitors, make our charge—$4,250—barely half the cost of any foreign car that makes a comparison possible.

We seek communication with those who will appreciate this car. For such is will give a service greater than any other mechanism the world has produced. Shall we send our book of details?

Specifications—model 8, 4 cyl. cylinder motor, forward under hood, Thermosiphon, 4 speeds forward, one reverse; selective type ignition, jump spark with magneto, Ignaritus and coil; Carburetor, double vein mixer; fluors and blades, special chrome nickel steel; Crank shaft, machined from solid billet; Junction axles, Forged in one piece; Frame, pressed steel; Wheel base, 124 inches; Tires, 36 x 4 inches; Clincher Rear Tires, Plain Rubber Tires; Demountable rims equipped with 3 Imperial Quick Detachable Rims; Left hand drive; Center control; Gasoline tank in rear; Capacity, 20 gallons; Gasoline feed, Stromberg Carburetor; Ignition, Bosch Magneto; Lubrication, Splash System; Cooling, Water circulated by pump; Radiator, Honeycomb; Clutch, Cone, leather faced; Transmission, Selective sliding gear, 3 speeds forward and reverse; Control, Left hand drive, center control; Brakes, 2 internal expanding, 1 external contracting on rear hubs; Steering gear, Worm and sector; Wheels, Artillery, 36 inch front, 36 inch rear; Tires, 36 x 4 inch clincher rear, plain rubber front; Equipment, Complete with mohair top, envelope, boot, glass front, gas lamps, generator, horn, tools in tool box, jack, pump, repair kit, tire irons, tire holders, mud guards, foot rail, robe rail, speedometer, electric dash and tail lights, trimmings in dark green leather, Prest-O-Lite tank.



THE F. B. STEARNS CO., Manufacturers, U. S. A.
9010 Euclid Avenue, CLEVELAND, O.
New York Branch, 251 WEST 58th STREET
Boston Agents, Rand Cadenhall Co., 225 Columbus Ave
Chicago Agents, Hitchcock Bros. Co., 1300-30 Michigan Ave
Lowers Equipped to handle such a car desired.

WOODS

Builders of Best Quality Electric and Gasoline

AUTOMOBILES

Write for Catalogue

WOODS MOTOR VEHICLE CO., - Chicago, Ill.

HARBURG TIRES

Typical of Great Strength.

If you can do better than the Harburg in the No. 1 fight, use the Harburg will stand up its life. The Hot Harburg is safe for it will not blow out and safe again because that

RUBBER WILL NOT SEPARATE FROM THE CANVAS

THE HARBURG TIRE CO.

1727 Broadway, New York

1906

Motor-Car Directory

400 Cars Illustrated and Described

104 Pages. $1.00 by Mail.

MOTOR, 1789 Broadway, New York

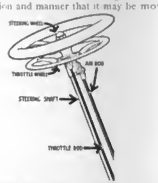
DELAUNAY BELLEVILLE AUTOMOBILE

If you wish to buy or sell a second hand car, see Motor Bureau, page 18

RAMBLER INGENUITY.

IN the past two seasons a familiar feature of Rambler cars has been the circular throttle lever under the steering wheel. No more simple and convenient system of motor control has ever been devised, and its appreciation was immediate and continuous. This will be continued as a feature of all the 1906 models with very slight modifications.

Briefly, the carburetor in each model is provided with a throttle valve regulating the amount of vapor served to the motor. The controlling lever is in the form of a ring or wheel, pivoted under the steering wheel in such location and manner that it may be moved



STEERING WHEEL THROTTLE.

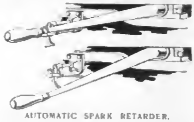
by either hand and without releasing the grasp on the steering wheel. The connection between lever and throttle is such that when the right of the lever is raised the throttle is open and the motor speed correspondingly increased. By depressing this side of the lever reverse action results. This may be effected by tightening the grasp of the right or left hand according to the increase or decrease of speed desired, or the motion in both directions may be effected by one hand alone.

To either the inexperienced operator or the speed fiend pushing his car to the limit, the ability to control the motor speed without removing the hands from the steering mechanism is a matter of unquestionable value, and the efficiency of this device will be readily understood on personal investigation.

THERE are a number of devices whereby ignition is automatically retarded in applying a loose starting crank, but the new Ramblers are probably the first cars in which a device of this sort is used in connection with a non-removable crank.

The device is very simple and serves the double purpose of a carrier for the crank when not in use, as well as a spark retarder.

As shown in the illustration, the crank is usually carried in a practically horizontal position and is prevented from jarring out by a pivoted latch. Extending rearwardly from



AUTOMATIC SPARK RETARDER.

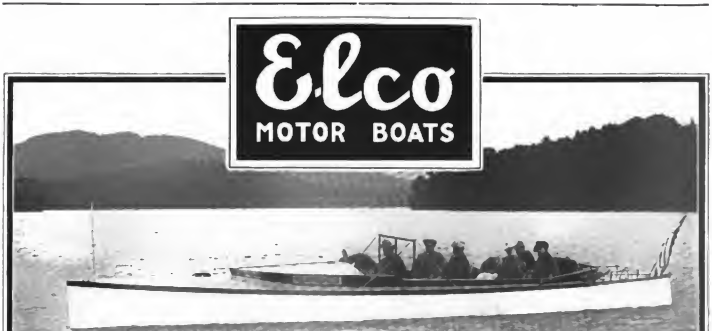
this latch is a rod, the free end of which normally bears against a plate on the radiator support. When the crank is disengaged from this latch, before being placed in operative position, this rod is, by action of the latch, forced from its bearing on the frame and the entire device is moved back by a spring provided for the purpose. As the main rod of the crank carrier extends back to and connects with the commutator, this action retards the spark to a point well over the center, thus absolutely preventing a kick back.

After the motor is started the carrier is drawn forward and the crank again hooked in place, thereby disengaging the main rod from the commutator and allowing the latter to be regulated by the regular controlling devices.

(Continued on page 116.)

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35-FOOT ELCO HIGH-SPEED MOTOR BOAT

Speed 22 Miles 50-60 H. P. Motor

"It will serve you on water as the Automobile does on land"

The ideal Motor Boat; 22 miles per hour with absolute safety and all comforts of the automobile. The sensation of traveling over the water at this speed is equal to driving a car sixty miles an hour. Water-tight bulkheads. Control of power as an automobile, permitting speed varying from 6 to 22 miles. Four individual bucket seats with aisle between and one wide rear seat. For protection from head winds and flying water, a glass wind shield is provided. A Cape Cart folding automobile hood covers seating space equipped with side curtains, giving full protection from rain.

ELECTRIC LAUNCHES

ELCO Self-charging Electric Launches can now be supplied. Our new invention, the *"charging motor"* has made possible the building of electric boats with *unlimited* mileage. Write for full information.

Our beautiful Illustrated Catalogue will be sent on receipt of four cents postage.

THE ELECTRIC LAUNCH COMPANY

Main Office and Works

AVENUE A, BAYONNE N. J.

NEW YORK OFFICE: 5 Nassau Street, N. Y. 30 min. from Liberty Street, N. Y. City, C. R. R. of N. J.
Chicago Office and Show Room: 1409 Michigan Ave.

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Columbia

construction for 1906 far surpasses the best work previously put into any motor cars, American or European. We tell all about it in our special illustrated booklets, "Columbia Chrome Nickel Steel," "Fashioning a Crank Shaft," "Transmission, Etc." and "Consistent Differences." Each of these booklets will be found intensely interesting by all who follow the latest advances in automobile building. Mailed on application.

THE NEW COLUMBIA GASOLINE MODELS ARE:

MARK XLIV-2 18 h. p.; two opposed cylinders; shaft drive; double side entrance body; seats five persons. Price - - - - - - - - $1,750

MARK XLVI 24-28 h. p.; four vertical cylinders; shaft drive; seats five. Price, Standard - - $3,000
Limousine - - - $4,000

MARK XLVII 40-45 h. p.; four vertical cylinders; double chain drive; seats five, with extra seats for two. Prices, Standard - - - - - $4,500
With Victoria, Limousine or Landaulet Body, $5,000 to $5,500

Separate Catalogues of Columbia Gasoline Cars, Columbia Electric Carriages and Columbia Electric Commercial Vehicles will be sent on request.

ELECTRIC VEHICLE COMPANY, Hartford, Conn.

New York Branch: 134-136-138 West 39th St. Chicago Branch: 1392-1334 Michigan Ave. Boston: Columbia Motor Vehicle Co., 74-76-78 Stanhope St. Philadelphia: Pennsylvania Electric Vehicle Co., 250 North Broad St. Washington: Washington E. V. Transportation Co., 15th St. and Ohio Ave.
Member Association of Licensed Auto. Mfrs.

FOR SALE: Imported RENAULT CAR

14 H.P. Landaulet; also equipped with extra open body. In first class condition.
A quiet, reliable car, handsomely fitted up. **PRICE, $2,800.**
Address TOWN, care of "MOTOR," 1789 Broadway, New York City

DON'T READ THIS

Unless you are interested in Commercial Trucks that are built absolutely "Foolproof"

That's the kind we build

American Motor Truck Co.

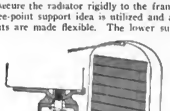
LOCKPORT, N. Y. 101 Elm St.
CHICAGO, ILL. Monadnock Bldg.

For advertisements received too late for classification see the last live advertising pages.

RAMBLER INGENUITY—*continued.*

ONE source of considerable trouble in many cars, particularly the larger types, has been entirely eliminated in the 1906 Ramblers. This is the warping of the radiator due to flexion of the frame, which almost invariably causes leakage and loss of the cooling water, often resulting disastrously to the motor when not soon discovered, or when a new supply is not immediately available.

In the Rambler cars, instead of attempting to secure the radiator rigidly to the frame, the three-point support idea is utilized and all the joints are made flexible. The lower supports

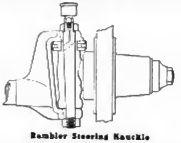


Rambler Radiator Support

have bearings of rocker type with cushioned retaining studs. The third point of support is a rod extending forward from the dash.

It may be seen from the illustration that the arrangement allows a wide range of flexibility in the frame without subjecting the water tank to the slightest strain.

A FEATURE in the new Rambler Models 14, 15 and 16, to which the manufacturers, Thos. B. Jeffery & Co., call particular attention is the construction of the steering knuckles. These are designed both for ease of action and adjustment for wear. The load is carried on a thrust bearing under the upper arm of the yoke, comprising two hardened tool steel plates and a row of thirteen 3/4-in. balls. The center pin is tapered from 1/4 in. at the top to 3/8 in. at the bottom. At each end is a nut bearing against the yoke, whereby the position of the taper pin within



Rambler Steering Knuckle

its bearing in the knuckle may be adjusted with absolute accuracy.

An oil vent through the center of this pin feeds oil into the bearing at the top of the moving contact, the oil being supplied by an oil cup seated in the upper end of the pin. By this device the bearing may be kept in absolute adjustment at all times, merely by releasing the upper adjusting nut and taking up the lower, thereby drawing the taper pin farther into its seat. Owing to the large size of the roller thrust bearing, there is practically no wear thereon. This device, in connection with the screw and nut type of steering mechanism, renders the steering of these cars probably easier than any other machine of similar weight on the market.

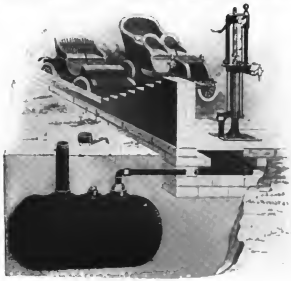


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BOWSER

THE STANDARD GARAGE EQUIPMENT FOR GASOLENE STORAGE

SEND FOR CATALOG



Long Distance Gasolene Outfit—Tank Buried—Pump in Building

WHETHER you use gasolene in large quantities or in small, for many cars or only one, in a large garage or a little stable, a BOWSER will afford you the maximum safety, convenience and economy.

This cut shows one of the many styles we manufacture.

Guaranteed proof against evaporation, leakage, waste and pilfering.

S. F. BOWSER & CO., Inc.
FORT WAYNE, IND.

Eastern Office
255 ATLANTIC AVENUE
BOSTON, MASS.

Glide 1906 Models



Model E 30 H. P. Glide

Model E is a 36 h. p. car with a vertical four cylinder motor. Bevel gear drive. Twin gear transmission.

Model F is an 18 h. p. car with a two cylinder opposed motor.

Both of these models are leaders.

Our new Catalogue is now ready.

THE BARTHOLOMEW CO.
413 Bradley Ave., Peoria, Ill.



Electric Vehicles

For Every Requirement

The common-sense practical features of our electrics place them at the head of their class for business purposes and social needs.

Over 100 Standard Designs
Send For Illustrated Catalogue

Vehicle Equipment Co.
Borden Avenue Long Island City New York
Largest Builders of Commercial Automobiles in the World



FRAYER MILLER

"THE CAR OF ENDURANCE"

COOLED THROUGH AIR JACKETS

Four Cylinder, 25 H. P., $3,000.
Six Cylinder, 40 H. P., $4,000.

AN AMERICAN PRODUCT

IMITATION OF NO FOREIGN CAR

THE system of cooling in the Frayer-Miller Car really marks an epoch in automobile gas engineering. There is nothing to compare with the FRAYER-MILLER AIR-COOLING SYSTEM. It is distinctive.

A Frayer-Miller Car covered more miles in one week than any other type of self-propelled vehicle.

The **Frayer-Miller Car at Long Branch** was driven 3,202 miles in 6 days, 15 hours and 29 minutes, equal to the distance from Golden Gate to Hell Gate.

During the last 1,866 miles of this trip the engine never stopped: **RECORDS FOR DISTANCE AND FOR ENDURANCE.**

The Frayer-Miller with its novel and striking air-cooled system is up-to-date and always successful. No water-cooling system would ever be necessary with the Frayer-Miller, or air-cooling system through air jackets possible with other makers.

The mud guard arrangement is novel and new.

Oscar Lear Automobile Co. Columbus, O.

NEW YORK BRANCH FRAY-MILLER MOTOR CAR CO.
Broadway and 65th Street, New York City

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ARDSLEY



QUIET, POWERFUL CAR

Guaranteed—a Horse-power for Every 60 Pounds Weight

35-40 H. P. : : Seats 5 Persons

Price, $3,500

SEND FOR CATALOGUE

ARDSLEY MOTOR CAR CO. : YONKERS, N. Y.

Members of American Motor Car Manufacturers Ass'n. Salesrooms, BROADWAY & 80th ST.

BIGGEST MUSIC "HITS," 13C.

And an Additional Beautiful 50c. Piece FREE.

(To purchasers sending on the names of three music purchasers.)

There is not one piece listed below that cannot be called an "Immense Hit." They are—every single one of them—bewitchingly sweet strains that everyone wants to whistle. These pieces regularly sell for 25c., 30c., and 50c. each, but in this special sale we will forward you our choice, postpaid, at the specially reduced cut price of only 13 cents. Read below how you can also secure the beautiful 50c. (copyrighted) song, "The Lily or the Rose," FREE.

VOCAL.

One Called Mother and The Other Home Sweet Home, by composer of "Blue Bell."
When You Gathered Sweet Magnolias, Jennie Dear. (Beautiful rustic ballad.)
So Long Mary, from Forty-five Minutes from Broadway.
Paddle Your Own Canoe, latest, by composer of "I've Got a Feelin' For You."
Dreaming, Love, of You, by Chas. K. Harris.
Have you Seen My Henry Brown, by composer of "Tensing."
When the Evening Breeze is Sighing Home Sweet Home.
I'm Daddy's Little Girlie.
My Name is Morgan, But it Ain't J. P.
Can't You See I'm Lonely.
Nothin' from Nothin' Leaves You.
Four Ball, from "Wizard of Oz."
In My Merry Oldsmobile, Waltz Song.
In the Golden Summertime, My Sweet Elaine.
What's the Use of Knockin' When a Man is Down. (Coon Song.)
Some Day in the Far Away. (Beautiful Ballad.)
Keep on the Sunny Side.

PIANO.

The Juggler, Two-Step, by composer of "Honeymoon" March.
Trip to Niagara, Two-Step. (Like the famous Chariot Race March.)
Dream of Madrid. (Bewitching Spanish Waltzes.)
Roaming in the Gloaming. (Beautiful reverie.)

EXTRA! One 50C. Piece FREE.

In order to secure the names of three genuine music purchasers in your locality, we will give FREE to all who order one or more of the above selections, the following additional beautiful 50-cent piece of music, "The Lily or the Rose." Read the description which follows and fill out the coupon below.

This is the FREE 50C. Piece



"The Lily or the Rose" has proved a tremendous success, and will be sure to equal in popularity, even the great hits "Blue Bell," and "I'-ie-ie-ally." These words (not musical terms) of vocal music may substitute for the above song our greatest two-step march, "Happy Hooligan,"—one of the finest in orchestration in years. Both of these pieces are published for piano, mandolin, guitar, banjo, violin, cornet, and are in parts. Select any 50-cent selection in addition to the above, and we will send it to you free. Send us 10 cents for any piece listed above, with all the same time entitles the names of three music purchasers and Two cents extra for postage—12 cents in all.

THIS IS THE COUPON

AMERICAN MUSIC LIBRARY, 1796 Broadway, New York City:

I enclose 13 cents for which please send me the following piece selected from the list above:

NAME OF PIECE .....

Also please send me the FREE 50-cent selection, in return for which I am enclosing (on another sheet of paper) the names of three genuine Booth purchasers, and 2 two-cent stamps for postage. (12 cents in all.

(Name of FREE selection here.) .....

My name is ..... City .....

Street ..... State .....

Fill out this coupon, insert names of pieces wanted, and return with 13 cents.

AMERICAN MUSIC LIBRARY, 1796 Broadway, New York City

For advertisements received too late for classification see the last five advertising pages.

THE PALMBLA CARBURETER.

IN order to get the greatest efficiency out of a gasoline motor, precisely the same mixture is required under all conditions and speed.

If it were possible to run a motor at one constant speed, it would be an easy matter to make a carburetter which would work under that condition, but in this day of flexible motors in which speeds are constantly changing as in the convertible two or four-cycle motor where the speed varies from 200 R.P.M. on the four-cycle to 1,200 R.P.M. on the two-cycle and when the motor is changed from one speed to the other, in an instant the fuel consumption is doubled or cut in two, it becomes absolutely necessary to design a very accurate self-operating device to do the work. It is only when the mixture is perfect that the motor gives its full power per impulse stroke and makes possible to run the motor under all speeds and with the greatest efficiency.

The North Chicago Machine Co., of North Chicago, Ill., had at the Chicago Show a carburetter embodying new features, its mechanism being based upon a new theory and a departure from accepted standards.

When the piston in the motor commences to draw in a charge, rarification immediately takes place in the body of the carbureter. The reason for this is because the intake air passage is closed by a flat seated valve and held in place by a helical spring of determined strength against which the suction must act. The instant a partial vacuum is created, the atmospheric pressure outside of the carbureter forces the intake valve open and air rushes into the mixing chamber. The fuel nozzle with needle valve is placed above the air passage and mixing chamber. It has a cone-shaped cap over which the fuel flows and reaches the base of the cone in a very fine spray and from there drawn into the mixing chamber. The vacuum in the body of the carbureter governs automatically both the supply of the fuel and air, the valve action at the entrance to the air passage literally following the movements of the piston in the motor. Consequently, the greater the speed of the motor, the wider the valve is forced open to admit the increased demand for air, the greater the tension on the intake valve spring and resulting in a more complete vacuum in the mixing chamber and the greater suction on the fuel nozzle. The result is a constant mixture.

By this means the proper proportions of air and fuel to make the right explosive mixture are not only created but the volume is governed entirely by the suction stroke of the motor. So by properly setting the tension upon the intake valve spring, the mixture cannot vary under different conditions.



THE PANHARD MOTOR-CAR REPAIR WAGON OR AMBULANCE NOW IN USE IN LONDON, WHICH RESPONDS TO TELEPHONE OR [OTHER], CALL FOR ASSISTANCE, TO MAKE A ROADSIDE REPAIR

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MOON 1906

The Best that Brains and Experience Can Build or Money Can Buy

DESCRIPTION

MOTOR—Special "Rutenber" 20-25 h.p., four cylinder, vertical. Mounted on sub-frame.
TRANSMISSION—Sliding gear type, three speeds forward and one reverse. Direct drive on high gear.
CLUTCH—Latest improved multiple disc.
LUBRICATION—Hill's Precision Oiler. Sight feed
IGNITION—Jump spark. "Wiberbee" storage batteries and "Spiderfly" coil.
FRAME—Cold pressed steel. Drop forged spring hangers.
DRIVE—Bevel gear.
RADIATOR—Improved honeycomb pattern, with fan.
SPRINGS—Highest quality, 40-inch front and 50-inch rear.
AXLES—Reinforced seamless steel tubing; ¾-inch ball bearings.
WHEELS—Wood, artillery pattern, 34-inch front and rear.
TIRES—4-inch Standard clincher, or detachable side flange.
WHEEL BASE—106 inches. Tread, standard, 56 inches.
SPEED—3 to 50 miles per hour.
WEIGHT—About 2,400 lbs.



Price—$3,000 f. o. b factory

MOON MOTOR CAR CO. ST. LOUIS, MO.

Members American Motor Car Manufacturers' Association, Chicago.

Scandinavian Fur and Leather Co.

Automobile Outfitters To Men and Women

¶ The reputation of Scandinavian garments and accessories has been built entirely upon quality of material, style, superior workmanship, fair price and square dealing.



¶ Our stock includes everything needed by a woman or man for automobiling, riding, driving and all out-of-door sports.

¶ We would be pleased to send you our *Catalog C* containing price-list and 200 cuts.

The Scandinavian Fur and Leather Company
14-16 WEST 33d STREET
Opposite Waldorf-Astoria NEW YORK

Sole Agents for the Pacific Coast:
KOOS BROS., Inc., San Francisco, Cal.

Special Wholesale Department

"Everything for the Autoist but the Auto"

The New Book is Ready. Please send for it.



We have issued a new illustrated catalogue de luxe of 200 pages devoted to the new imported and domestic models of automobile apparel for men and women for Fall and Winter service. Presented are garments of fur, leather, cloth and rubber, together with a comprehensive series of requisites. To you we would be pleased to mail a copy without charge.

Saks & Company Broadway, 33d to 34th Street New York

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Celebrated Hats
correct in every particular.

"Ornatus et Bonitas."

EXTRA QUALITY
DUNLAP & Co.

SPRING STYLES
Now On Sale.

New York. Chicago.
Philadelphia.

And Accredited Agencies in all Principal Cities of the World.

A FRENCH MOTOR-CAR DRIVER'S CERTIFICATE OR CERTIFICATE DE CAPACITE



THE FRENCH CERTIFICATE DE CAPACITE CARRIED BY GEORGES DUPUY IN PARIS



RANDS MFG. CO.
MACOMB & ST. AUBIN STS. DETROIT, MICH.
WHEELER MANUFACTURING COMPANY

TOPS FOR ANY MAKE OF CAR

OUR PATENTED EXTENSION TOPS SEMI-LIMOUSINE AND CANOPY WITH CONCEALED BODY IRONS ARE HIGH CLASS

FACTORY CAPACITY 5000 TOPS PER ANNUM

EXTENSION TOP WITH SPARE SEAT FOLDING INTO BODY WHEN NOT IN USE

"Slip On" Motor Coat
made of English gabardine cloth, rain proof and practically indestructible. Its roominess and freedom of movement makes it the finest motor garment made.
CAPPER & CAPPER,
Designers of Sportsmen's Clothes
60-67 Jackson Boulevard CHICAGO

THE HIT OF THE SEASON
GABRIEL HORNS
work with foot lever from exhaust. Let us furnish you with estimate on Cape and Slip Covers.
Auto Cover and Top M'f'g Co., Inc.
Telephone, 4734 Columbus. 148 W. 56th St., N.Y.

SEE THAT YOUR DRIVING COAT OR RIDING CLOTHES are made of
"Cravenette" CLOTHS
"Rain will neither wet nor spot them."
Look for "Cravenette"
(trade-mark) stamped on back of cloth.
B. PRIESTLEY & CO.
Manufacturers of Woolens, Cravenette Cloths, Black Dress Goods, Mohairs, etc.
71-73 GRAND STREET, NEW YORK
Write for interesting booklet—free

Established in 1868
AUTOMOBILE TOPS FROM $10.00 UP
Official top manufacturers to the Country Club. Unique styles per year, first cost prices, we can save you money.
DUDE & SCHUG, Chi'll, O.

AUTOMOBILE TOPS
SLIP COVERS
ENGINE COVERS
CAPE TOPS FROM $35 UP
Send for samples and agency proposition.
Auto Top and Equipment Co.,
1684 Broadway - - - New York

Original Manufacturers Auto Top Materials
We are headquarters for waterproof materials of all kinds and make a specialty of materials used in the manufacture of Auto Tops, Storm Curtains, Slip Covers, etc.
Write for Samples and Price List
L. J. MUTTY CO., Boston, Mass.

ALUMINUM BODIES
Springfield-Tops
SPRINGFIELD METAL BODY CO.
376 Birnie Avenue
Brightwood
Springfield, Mass.
1, 4 and 5 Bow Tops and Attachments for all cars

Automobile "CROVENETTE" Cost you but $10.00 at
WHY PAY $15.00 to $25.00 ?
TOM MURRAYS
Jackson Bv. near S. of T.
CHICAGO

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A THOROUGH CHEST AND THROAT PROTECTOR FOR MEN, WOMEN AND CHILDREN
THE WAY MUFFLER CO.
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Scott Muffler Co.
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Runabout Bodies

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Also
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This is the man that made the top, that made the hit that pleased the crowds at the Auto Shows.

Col. Sprague

THE SPRAGUE IDEA *The* MADE THE SPRAGUE WAY

Sprague Tops

The Guaranteed Tops



IT'S RIGHT

COL. SPRAGUE'S

FOLDING FRONT.

Ask for our catalogue.



Something to Remember about Sprague Tops
They are right They work right

THE SPRAGUE TOPS AND FRONTS are made from blue prints by experts, every part is the best that can be made. We make the whole fabric. IF IT'S A SPRAGUE TOP IT'S RIGHT IN EVERY PARTICULAR.

You possibly can afford to buy a top before seeing the SPRAGUE TOP. You may have to do so, but if you can, get a SPRAGUE TOP. You will not be disappointed.

THE SPRAGUE UMBRELLA CO.
NORWALK, O.
Sole makers of the **Sprague top;** made the **Sprague way**

KING MFG. CO.

WE ARE NOT IMITATORS, BUT ORIGINATORS
THE BEST TOPS AT THE LOWEST POSSIBLE PRICES

The top is an important part of the equipment of the up-to-date automobile. If you want one with plenty of style, light in weight, yet strong and durable, investigate the KING line. It is



the most complete on the market. Any style, any color, any size, made for any machine. Get our catalogue, samples and prices and you will not purchase elsewhere.

Prompt Shipment Guaranteed
KING MANUFACTURING AND GARAGE CO.,
82 W. Main Street, Springfield, Ohio

AMERICAN TOP CO.

AUTOMOBILE TOPS

LARGEST TOP FACTORY IN UNITED STATES

If you are looking for the highest grade Auto Top, we have it. : :

Every variety but the CHEAP LEATHER-COVERED BOW SOCKET TOP.

AMERICAN TOP CO.
Jackson, Michigan

Capacity, 300 Tops per week

Manufacturers! Owners!

Write for our new Catalogue describing all the new features of our new style tops for 1906 cars. It contains just what you want to know.

Best Shapes

Features Newest



Best Materials

Lowest Prices

Springfield Auto Top & Upholstering Co.
102-106 Dwight St. Springfield, Mass.

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Order an

AUTO-CLE WRENCH

At the same time investigate



THE STANWOOD STEP

Ask for them

Railway Appliances Co.

84 Van Buren Street CHICAGO

Do you use the Kirkham Auto Motive Power Equipment? If not you had better investigate them before closing for the season, as we deliver the goods in quantity and quality at the price you ought to pay.



THIS CUT shows our 18 22 h. p. 4 cylinder water cooled machine, weight as shown 265 lbs. We guarantee 26 B.H.P. maximum from every motor of this type.

Are you interested?

The Kirkham Motor Mfg. Co., Bath, N. Y.



AUTOMOBILE BRAKE CONTROL

as easy and as positive as the air brake control of a railroad train is effected by the

Watres Spent Gas Brake

operated by a touch; uses only spent power; simple-compact and easily attached.

Attached to the cylinder which operates the brake to a chime whistle; also a tire filler. Price, complete, ready to attach to any car, $60.00.

Booklet with complete description free on request.

GAS ENGINE WHISTLE CO.

1121 Broadway New York City

Chicago Representative, Wm. Johnstone Co., 1303 Michigan Avenue, Chicago, Ill.

New England Representative, The Canneet Co., 1024 Boylston Street, Boston, Mass.

BRAKES.

THE internal expanding brake this year seems almost completely to have ousted the external type, particularly for use on the rear hubs. No doubt this is largely due to the fact that it lends itself more conveniently to the general arrangement of the rear axle and related parts. Coincidently has come the combination distance and torsion rod for side chain cars, the large end of the rod being made to swivel on the axle while the small end has a threaded eye for adjusting the chain tension. Generally the body of the rod is of I-beam section, tapering from back to front, and it has brackets at the large end which support the brakeshoes and brake operating mechanism. The device has been used on the Mercedes and other cars for a couple of years or more, but this year it is found almost universally. Its function of course is to relieve the rear springs of the wrench which they would otherwise receive when the rear brakes take hold. In the Martini car this radius rod is stamped out of steel, and in the Columbia it is a manganese bronze casting, but these are exceptions.

The large size of all the brakes is a marked feature of the foreign cars. On the Renault and the C. G. V. in particular the drum on which the foot brake acts is enormous, being really larger than the brake drum seen on the rear wheels of many American cars up to 24 M. P.

The idea of supplying a second foot brake is finding a respectable number of adherents. The Mercedes has, as before, two independent foot brakes, one on the differential, the other on the jack shaft, both water cooled. In the 1906 car these brakes, as well as those on the rear wheels, are adjustable by hand without the use of tools of any sort. The Fiat has two brakes somewhat similarly arranged but operated simultaneously through an equalizing lever by a single pedal. The purpose presumably is to distribute the wear and permit a more powerful braking effect to be obtained than would otherwise be possible with a given diameter of brake drum, it being impracticable to increase the diameter on account of interference with the floor of the body. The Rochet-Schneider, which formerly had two brake drums, one on each side of the differential, now has one of extra width, on which two entirely separate brake drums act through separate pedals. Two cars, the Peugeot and the 60 M. P. Clement Bayard, have the gear case separated from the differential case by a distance sufficient to interpose a brake drum and a jointed shaft, this arrangement being facilitated by the length of wheel base now required for side entrance bodies. The extra brake thus provided on the Peugeot is operated by one foot lever; and, by way of departure from common practice, the brake on the differential is operated by the emergency lever at the side, and the rear wheel brakes are engaged by a pedal under the right foot. Of these brakes, the one first mentioned is independent of the clutch. In the Berliet, handled by the American Locomotive Automobile Company, there is a brake drum on each side of the differential. On the Columbia the pedal brake drums are integral with the sprocket pinions and are therefore outside instead of inside the frame. They are, of course, simultaneously operated.

It is obvious that the simple split expanding ring, rigidly supported opposite the split, does not make a very efficient brake, for the reason that the portions near the point of support can never come in contact with the brake drum. To avoid this difficulty in some cars the ring is given a floating support by slotting it out radially where the supporting pin passes through it, and employing a spring to hold it clear of the brake drum when out of action. When the ends are spread by the cam or toggle the shoe is forced into contact with the drum through its entire circumference. In the Peugeot a pair of semicircular shoes is employed, whose ends opposite the toggle are notched to rest against a stud, which acts as a pivot. This is better than the

(*Continued on page 124.*)



HESS-BRIGHT BALL BEARINGS

In first six cars leading

GORDON-BENNETT CUP RACE

Repetition of all previous G. B. and Vanderbilt events.

The Hess-Bright Manufacturing Co.

243 N. Broad Street, - - PHILADELPHIA, PA.



We want an opportunity to figure on your 1906 Mufflers.

THE WEEBER MUFFLER

is being used by the largest and most prominent Automobile Manufacturers. It is quiet, durable and looks well. Will give full power of engine and have a pleasing tone to exhaust. Will guarantee absolute satisfaction or refund the money.

Special size Mufflers for Winston Autocar, Peerless, Olds, Franklin, Ford, Quorry, Maxwell-Briscoe and many other well known cars.

C. E. WEEBER MFG. WORKS

ALBANY, N. Y.

For Watch for the New Weeber Carburetor; it will fill all requirements of the Motor and will have original features, not found in others.



Bevel Drive Differential

WARNER DIFFERENTIALS

"A MECHANICAL MASTERPIECE"

Large Variety of Sizes and Styles

Both Sprocket and Bevel Drive

We will make any size or ratio of Bevels or Spurs, both you want

Steering Device Positively Positive

Three Teeth Always Engaged

Warner Gear Co., - Muncie, Ind.

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IS THE STANDARD

Manufactured by

The Whitlock Coil Pipe Co.

HARTFORD, CONN.

Radiators and Coolers of Every Description.

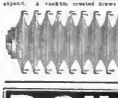
A SEAT SPRING

That will not Set, and will not Slip. Our unlimited capacity assures you prompt service.

NATIONAL CUTLERY CO.,

Detroit, Mich.

THE TARBOX SILENT AIR COOLED MUFFLER Pats., FOR AUTOMOBILES Reduces all mufflers. Prevents fire in tires. Cannot explode or clog. Increases direct exhaust. A cool muffler. Reduces the burnt gases from combustion, causing 3 to 5 h. p. more use. 15 per cent more power. Reduces Soot in muffler and engine. Keeps engine clean. Makes it run smoother. Guaranteed with hood. Price reasonable.



D. B. Smith & Co. Utica, N. Y., U. S. A.

BOILERS

7 Distinct Styles: 150 Sizes

Our Specialties: Expansion Joint Dry Plates, Flat Head Tubes, Guaranteed Repaired Work.

Steam Carriage Boiler Co., Oswego, N. Y.



MIDGLEY

Artillery Pressed Steel Wheels

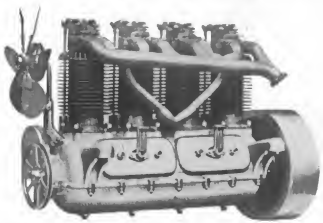
MIDGLEY MFG. CO.

Columbus, Ohio

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Carrico AIR COOLED ENGINE



—works 365 days a year.

A MANUFACTURER to be a successful manufacturer never condemns just because others may say, "I prefer so and so."

He doesn't carry a know-it-all air in expressing his opinions---he investigates---he tests ---he experiments. Then and then only is his opinion of value.

Now that's all we want---an honest expression---and the only way to get it is to permit us to demonstrate why our "Carrico" 4 cycle air-cooled engine is really the best—and most practical and by long odds the most profitable.

Mr. Carrico's ingenious brain aided by his nine years' experience in building air-cooled engines has now produced improvements that improve.

You should investigate if you want to do justice to your product---that's all we ask.

Our catalog gives details---you should get it---it tells how well he has designed, and how well we make this advanced-idea-engine.

SPEED CHANGING PULLEY CO.
INDIANAPOLIS, IND.

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THE
BALL IMPROVED TRANSMISSION AND REVERSE GEARS
For Automobiles and Motor Boats
MADE ONLY OF
SPUR GEARS
Patented Apr. 6, 1901; Nov. 5, 1901; Jan. 13 1903; Feb. 10, 1903
NEW YORK GEAR WORKS
84 Nilson St., BROOKLYN, N. Y.
Western Agents, J. H. NEUSTADT CO., St. Louis, Mo

SHELBY
SEAMLESS-STEEL-TUBING
BEST MADE FOR AUTOMOBILE CONSTRUCTION.
SEND SPECIFICATIONS
WE QUOTE PRICES
SHELBY STEEL TUBE CO.
PITTSBURG, PA.
BRANCH OFFICES—NEW YORK—CHICAGO.

GRAY MARINE ENGINE
Guaranteed Absolutely
4 H P Base Engine develops nearly 5 $54.00
2 H P Base Engine develops nearly 3 $39.50
THE SIMPLEST AND MOST POWERFUL MARINE GASOLINE ENGINE OF ITS SIZE IN THE WORLD
Reversible engine. Jump spark. Perfect lubrication. Crank Shaft, *drop forged steel*. Connecting rod, *bronze*. Pistons *ground to* fit. All bearings either bronze or best babbitt. *Best material* and workmanship throughout. Get description of our
16 ft. Gasoline Launch $96
Send for prices of
1½, 7, 15 and 24 H. P. Engines
For Catalog GRAY MOTOR COMPANY, 455 Gouin Street, Detroit, Mich., U. S. A.

BRYANT RIM FOR AUTOMOBILES
Tire removed in thirty seconds.
Replaced in same time.
Advertised in leading magazines.
Sales easily made and every rim guaranteed.
Money refunded after 30 days if not satisfactory.
We want every dealer to become a BRYANT agent.
Ask about it.
THE BRYANT STEEL WHEEL AND RIM CO.
452 Hayden Bank Bldg. COLUMBUS, OHIO

NO MORE BLOW-OUTS
If You Use The TIRE SAFETY VALVE
Send to-day for descriptive circular and prices. Liberal discount to dealers.
Eastern Auto Appliance Company
Journal Bldg., Boston
Actual size.

A COOLER THAT COOLS
Investigate this. It is positively the best cooler on the market to-day. Does wonderful work. Great strength and durability. Won't clog up. Won't leak. If damaged by accident, broken tubes can easily be replaced. Write us.
FEDDER'S MFG. WORKS.
Buffalo, N. Y.

Asbestos Filled Copper Gaskets
Absolutely guaranteed to give satisfaction. Any size or shape to order. Sheet Metal Work. Carburetter Floats. Clock, Ammeter and Odometer Cases.
GOODWIN & KINTZ CO.
Winsted, Conn.

Herschell-Spillman Motors
AUTOMOBILE AND MARINE
16-18; 24-30; 45-55 H.P.
Vertical Four-Cylinder Types
Herschell-Spillman Co.
North Tonawanda, New York

We are ready to quote You on Parts for ALL AUTOS.
Would also announce that our specialties are Artillery and "Steel Wire" Automobile Wheels, fitted up complete. Prompt deliveries. Write us to-day for our prices, which are second to none.
JAMESVILLE WHEEL MFG. CO.
JAMESVILLE, N. Y.

Hose Couplings
ALL AUTO SIZES IN STOCK
B. MORGAN
40 John St., Newport, R. I.

CANT BLOW
THROUGH GLASS
LET US BUILD YOUR FRONTS
Jas. Murdock Frit Co.

which acts as a pivot. This is better than the split ring, as the shoes do not resist expansion against the drum, and there is only about 3 inches of ineffective service on each. In the higher priced cars a threaded adjustable toggle joint is used for spreading the brake shoes, but in the lower priced cars a small cam arrangement is used instead.

In the De Dietrich is seen the entirely novel feature of a spring relief in the tension rod which operates the emergency brakes on the rear wheels. This takes the form of a barrel containing a plunger and compression spring; the spring begins to compress just about the time that the clutch (which is connected to these brakes) is fully released, and its only function appears to be to prevent the operator from locking the brakes so hard as to slide the wheels.

With two braking systems, as well as with three, it is getting to be quite the thing to have one brake independent of the clutch, for the purpose partly of permitting it to be simultaneously used with the throttled motor when coasting, and partly also to make it easier to start the car after coming to a standstill on an up grade. Cars in which all of the brakes are connected to the clutch require some skill and responsive carburetor to start them on a steep hill, as it is easy for the car to start backward between the time when the brakes will let go and the clutch takes hold. With an independent brake, however, the clutch may be let in slowly till the motor has slowed down to its working speed, and the throttle is fully open, after which the car will start instantly when the brake is released.

There is, however, no uniformity of practice as to whether the brake selected for independent operation shall be the foot brake or the emergency brake. There is about as much to be said for one arrangement as for the other, but some standard should be reached, as the diversity of custom adds materially to the danger of the operator making a mistake in an emergency, and either stripping his gears or failing to stop the car.

The practice of making both the foot and emergency brakes act directly on the rear wheels, which appears to have been begun in the Packard car of 1904, finds a considerable number of adherents, among whom may be mentioned the National, Peerless, Frayer-Miller, Queen, Rambler, Grout, Thomas, Cadillac, and others. Usually the foot brake acts on the outside of the drum, and the lever brake on the inside, but sometimes the reverse arrangement obtains. Of course only propeller shaft drive cars can conveniently be equipped in this way.

In the new Pope-Toledo Model XII, of 35-40 M. P., both of the braking systems act directly on the rear wheels, but, instead of having one set of bands inside and the other outside of the same drums, the latter are made of unusual width, and in each drum is a pair of expanding shoes located side by side, and operated, one by the emergency lever and the other by the foot. The foot brakes only are connected to the clutch. The brakes are supported directly by the rear axle, and the radius rods are of the simple pivoted form, and do not serve the function of torsion rods.

The new four-cylinder Northern has a number of decidedly novel features, among them a system of pneumatic control for the brakes, and a pneumatic clutch which was described last month. The motor has mounted on it an air pump of size large enough to render a storage tank unnecessary. It is operated from the rear end of the cam shaft, and delivers air through valves operated from the steering column to the clutch and to a small piston cylinder which operates the contracting brake bands on the rear wheels. A separate set of internal expanding brake shoes is provided, which is independently operated by a pedal. It is claimed that the pressure produced by the pump is from 60 to 75 pounds, and that a much lower pressure is sufficient to operate the clutch and brakes. By opening the air valves slightly and then quickly closing them the brakes may be partially set, or the clutch may be slipped.

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WHY DO YOU SELL IT?

Why do you sell your car?

Generally because it has not power enough and you want one that can go faster or has power enough to climb hills easier.

WHY DO YOU SELL IT?

When by merely attaching one of our gasolene tanks or more properly gas producers, you can get all the added power and speed you want, and in a short time save the cost of the outfit by having the cost of your fuel cut down one-half.

Look into the merits of our device and you will be convinced of the truth of what we say.

AMERICAN GENERATOR CO.

N. E. Corner 63d St. and Park Ave.
NEW YORK CITY

There is no question about BrennanMotors

WHEN you buy another kind of motor the inevitable question is sure to rise in your mind—Will it do what is claimed for it? But there's no question about

BRENNAN MOTORS

They are standard the world over—always ready—always do what we say they will.

Read what one user has to say:

Stuyvesant, N. Y.,
November 21, 1905.

The Brennan Motor Co.,
Syracuse, N. Y.

Gentlemen:—

The 12 H. P. Motor which I purchased of your company for my Model A Cadillac car could hardly suit me any better, as it takes all the hills on high gear with no perceptible change of speed. It uses very little gasoline, a gallon having on several occasions driven us over 25 miles over rough roads.

Very truly yours,
THOMAS BAER.

BRENNAN MOTOR CO.
Syracuse, N. Y.

We make special Motors and Transmission Gears for Oldsmobiles, Northern Runabout, Olds Touring Cars, Cadillac, Ford, Thomas Model 17 and 18, General, Yale, Autocar, White steam cars, Glide, Rambler, Cleveland, Grout, Pope-Hartford, Sandusky Runabout, St. Louis Runabout, Marr, and all standard makes of cars. Special motor and transmission for commercial cars.

GUY L. SINTZ
MECHANICAL ENGINEER
CONTRACTOR, MANUFACTURER
GRAND RAPIDS, MICH.

OUR GUARANTEE

Of one year on Engines, Transmissions and Commutators is positive, and means much to you.


Commutator.

COMMUTATORS
built to fit any size Motors.

1	Cylinder,	$6.75
2	"	7.00
3	"	7.25
4	"	7.50

Hardened Steel Points.
Roller Contact.
Dust-proof Case.


Motors built 8 to 40 H. P.







Neustadt Automobile & Supply Co.

826-28-30 S. 18th St., St. Louis, Mo.

The "ONE" establishment that supplies every requisite for the Complete Automobile.




The Builder
The Assembler
The Repair Man
The Jobber
The Dealer




1906 Catalog

Send for "Snaps"



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Electric welding means more profit, better work at less cost, and satisfying results not otherwise possible, to any Manufacturer who employs it.

Our equipment for making any special welds after your own specifications is unequalled.

We "weld well" because our facilities preclude any unsatisfactory work.

THE STANDARD WELDING CO
CLEVELAND
McCLERNAN & ORR - WESTERN REP'S - CHICAGO

THE LEE MANUFACTURING CO.

AUTOMOBILE SPECIALTIES

The Lee

WE WANT CONTRACTS for Transmissions, Carburetors, Oilers and other Automobile parts.

Full equipment and capacity for completing large contracts promptly. We have made steam goods for **20 YEARS**—no experiment to intrusting your work to us. Last season we made parts for some of the largest motor car makers, and this season will do much more. Accurate work only. Send blue print, stating your wants and get estimate. Correspondence solicited. Special Gear Cutting.

THE LEE MFG. CO. 2100 Carver St., Port Huron, Mich.

Mercedes

If you have a Mercedes Car and want any parts, we can furnish them. Or any repairing, we can do it.

National Automobile Co.

TELEPHONES 1580 1581 79th ST.

Yorkville Garage
305-7-9 E. 80th St.

Machine Shop
317 E. 73d St.

NEW YORK CITY

THE HATCHER AUTO PARTS CO.

WE WILL PROVE any and all automobile parts that we manufacture by allowing thirty days' trial; in fact we prefer to deal in this way with our customers.

Our reputation for manufacturing reliable and practical automobile parts was established years ago, so that now our Guarantee means that everything we manufacture is as near perfect as science, material and skilled workmen can make them.


CARBURETOR

Our carburetor is automatic and furnishes a perfect mixture at any speed; in all kinds of weather. They are made to fit any style engine.

Send for complete catalogue of parts.

THE HATCHER AUTO-PARTS COMPANY
Mechanical Engineers, Constructors and Manufacturers of Automobile Parts and Specialties
158 VIADUCT - CLEVELAND, OHIO
Successors to The Brew-Hatcher Co.

Queen Cars

BEAUTY



POWER

26-28 H. P.	MODEL "K"	$2000.00
16-18 H. P.	MODEL "E"	1100.00
10-12 H. P.	MODEL "F"	800.00

The Majestic Automobile Company, 54th Street and Broadway NEW YORK CITY

Write for Descriptive Catalogue

SOCIETE ANONYME L'ASTER, PARIS.

The BEST FRENCH MOTORS for Automobiles and Boats.

MALICET & BLIN, FRANCE.

Complete French Chassis, Gear Cases, Steering Posts, Differentials, Ball Bearings and Automobile Parts.

ASTER CO., AMERICAN BRANCH,
1591 Broadway, New York.

"The Aster Car," "Aster Tri Car," "M. & B. Parts," "S. I. T. Accessories."

Send for Illustrated Catalogues.

Watkins Engines of Quality



We want to place our brand new, handsomely illustrated and complete catalogue in the hands of every yacht owner who desires to better the going power, reliability, economy and attractive appearance of his craft.

Our Marine Gasoline Engines

from 2 to 12 horse power, represent no obsolete styles, but the very newest patterns, of assured efficiency and strength—weight only where weight is required. Built under the direction of manufacturers of years of experience in a model gas and gasoline engine plant, from the very highest grade of material, machined by skilled and careful workmen. Every engine carefully tested, from four to ten hours under full load, before shipment. Fully guaranteed. Write to-day for catalogue and prices which are bound to interest you.

The Frank N. Watkins Manufacturing Co., 830 Raymiller Street CINCINNATI, O.

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The Erie Dining-Car Service is Unsurpassed

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An Important Announcement
Concerning

OLD ENGLISH

BLACKJACKS

THE Gorham Company desires to direct attention to its extremely novel and original collection of Loving Cups and Tankards, offered under the name of "Old English Blackjacks."

THESE have been designed especially to meet the very wide-spread demand for articles of this nature which shall be as dignified and as decoratively effective, but yet not so costly as though fashioned of solid silver. They are made closely to simulate the Old English "Blackjacks" and "Leathern Bottels," those characteristic drinking utensils of the sixteenth and seventeenth centuries, which are to-day so eagerly sought after by collectors of artistic rarities.

THESE strikingly original examples of an artistic revival are to be found in all sizes from the drinking mug to the imposing Loving Cup, the tall Tankard or the well-proportioned Flagon. The bodies are of heavy hand-worked leather, the linings of red copper, the mountings, including the shields for monograms, inscriptions or armorial bearings, of sterling silver.

BLACKJACKS are exclusively made by The Gorham Company at very moderate prices, from five dollars upward, and are to be obtained from the important jewelers throughout the country, as well as from the makers.

THE GORHAM COMPANY

SILVERSMITHS & GOLDSMITHS

FIFTH AVENUE AND THIRTY-SIXTH STREET, NEW YORK

(The New Gorham Building)

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Quick Detachable Tires



Off and On in less than a minute

The simplicity of the *Goodrich Quick Detachable Tire and Rim* appeals at once to the uninitiated. Only two parts. The steel ring used to lock the tire on can be removed in a second. Simply deflate the tire, unscrew the valve stem, unlock the rim as shown in the illustration and slip the tire off.

The easiest detachable tire on the market. No lugs, no clips, no pinching of the inner tube, no possibility of the tire wearing loose, no bolts, screws or turnbuckles of any sort.

And it is as easy to put on the tire as it is to take it off. *You can do it in less than a minute* with no experience, and once on it will stay on. No possible chance to come off.

Our special booklet tells the whole story and illustrates it. Please write for a copy.

B. F. GOODRICH CO., AKRON, O.

New York, 66-68 Reade St. & 1625 Broadway.
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Detroit, 80 E. Lamprey St. Philadelphia, 919 Arch St.
St. Louis, 3926-28 Olive St. Boston, 161 Columbus Ave.
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The Leavitt Secondary Distributor



Leavitt Distributor

Through its **unequalled simplicity** has clearly proven the superiority of this system of ignition. The past season's success has proved our claims.

Our primary timer is the fastest made, the least affected by wear. We have **absolutely solved** the question of **burned contact points.**

Our goods are fully guaranteed.
Submitted to manufacturers on trial.



Leavitt Timer

Siren Horns

We are in a position to manufacture **Timing Devices** other than our own design and are at present making timers for many of the largest complete vehicle builders who do not care to equip their plant for this special work. We can save you money; ask us to quote prices.



We are the only manufacturers in America of the new French Siren horn for automobile and motor-boats. To hear it is to want one. When you blow it they know you're coming.

Send for Catalogue and Prices

UNCAS SPECIALTY CO.
Norwich, Conn.

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CARTER FRICTION DRIVEN MOTOR-CAR.

THE Motorcar Company of Detroit, Mich., had their new but tried product, the "Carter Car," with friction transmission, at the Chicago show.

The motor is of the two-cylinder, opposed type 5x4½ inches, developing 20 motor power, and is located crosswise in front under hood. The cylinder castings are of the best selected close grain gray iron. The pistons and crank shafts are ground. The crank shaft is forged and has a flange forged on the shaft to carry the fly wheel. The fly wheel is made with a solid web and finished all over, thus insuring absolute balance.

The lubricating system is original and unique, consisting of an oil tank of large capacity forming part of the crank case cover. Inside the oil tank, and completely submerged in oil are four slow-moving valveless plungers which feed the oil with slight pressure to the cylinders and bearings. In case of obstruction to the pipes, a pressure is generated by the pumps and the obstruction thus forced out. The location of the oil tank and pipes in close proximity to the motor insures against the congealing of the oil in cold weather and greatly reduces the complication of the oil piping. The oil feed stops when the motor is not in motion. The location of the motor is such that the valves may be removed in a moment and all parts are accessible.

Transmission is by means of the Carter friction transmission, covered by letters patent. This device has been tested during the past three years under the most trying conditions and is absolutely guaranteed by the makers to transmit the full power of the motor economically and be free from wear. Its absolute simplicity will appeal to those who are familiar with various kinds of transmission. It provides an absolute control of speed from nothing to full speed and reverse, and changes can be made under any condition, either from low to high or high to low in hill climbing or in other severe places.

The construction of the friction drive will, no doubt, be understood by the description, by which it will be noted that the friction disk mounted on a laterally moving shaft is driven direct from the crank shaft of the motor. The friction wheel is slidably splined to the cross shaft so that it may be thrown to any position thereon by means of the lever at the right of the driver's seat. Contact is by means of a foot lever moving the friction disc and its shaft rearward against the friction wheel. Very slight movement is required and a surprisingly small pressure is necessary for the most severe work. The motor and transmission are level, thus obviating difficulties which are often encountered when the motors are inclined. The motion of the car is reversed by throwing the friction wheel past the center of the friction disc and for ordinary brake purposes this reverse motion is used, the friction wheel being thrown to the reverse side and a slight pressure applied, allowing the friction wheel to slip on the surface of the friction disc.

Raymond brakes are used on the hubs of the rear wheels for emergency only and by an automatic device. When these brakes are applied, the friction disc is released. The drive to the rear axle is by means of a single chain of large size.

The frame is of pressed steel of channel section. The springs are 2 inches wide, the front 38 inches and the rear 46 inches long. Wheels are of the artillery type with standard tread, wheel base 64 inches. The steering gear is of their own design and manufacture, provided with attachments for readily eliminating wear and back lash. The spark and throttle control are above the wheel. Axles are of the tubular type with Hyatt roller bearings in rear and large ball bearings in front. American roller bearings are used in the cross shaft to which the friction wheel is attached.

A 15-gallon gasoline tank is provided under

(*Continued on page 130.*)

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Not all the people in the country could or would buy your wares, Mr. Manufacturer. It behooves you, therefore, to confine your efforts to your possible clientele.

The 6,000,000 readers of the Ladies Home Journal are approximately the 6,000,000 people who would be most liable to buy your goods. Here you eliminate the waste and appeal to that great stratum, the liberally-buying public.

It's worth thinking about—this economy of appeal.

The Saturday Evening Post is read by 3,500,000, largely men. Perhaps it is more suitable to your use than the Journal. Perhaps you could use both profitably.

Of one thing you may be sure—our advice is candid. With our advertising columns frequently crowded for space, we are under small temptation to lead you astray.



THE CURTIS PUBLISHING COMPANY

PHILADELPHIA

New York Chicago Boston Buffalo

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CLUB COCKTAILS are made of choicest liquors, scientifically blended and aged to perfection. The original brand.

Seven kinds—Manhattan, Martini, etc.

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When you cannot get a facial massage use
PEACH BLOOM
—the combination skin tonic and antiseptic substitute for powder. $1.00 a bottle. For white hair use Miss Milo Special White Tonic for White Hair. $1.00 a bottle.
For pale, wan, ill-nourished skin, use Rosette Cream —$1.00 per jar. Express prepaid on $2 order by
ITHACA TOILET CO., Ithaca, N. Y.

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Daily list of new auto owners in N. Y. State, furnished on date licenses are issued...$2.50 per month. Daily list of those from Greater New York and vicinity ..... $2.00 per month. Our lists give the name and address of owner, and the license number, make and motive power of machine.
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600 on the Parks of Greater New York
Send for illustrated booklet. If your dealer does not sell them we will quote you special prices and terms. ALL OUR MOWERS POSITIVELY GUARANTEED
COLDWELL LAWN MOWER CO.
21 Coldwell Street, Newburgh, N. Y.

the seat and is directly connected to the frame. A device is provided in the gasoline tank so that when the supply of gasoline is reduced to about three gallons, a warning is given so that the operator will know positively that the supply is down to that quantity so that he will have an ample supply to get to a point where it can be replenished.

Ignition is by battery of two banks of six cells each and double spark coil, the battery box being located below the footboard, and water tight.

Three designs of bodies are regularly furnished to fit this chassis, one being of the Tulip design; the other of the Victoria and a delivery body is also provided. These various bodies are readily interchanged and may be removed or put on in five minutes, as special attention has been given to the construction of the chassis so that no wires or pipes or levers need be connected or disconnected when the bodies are changed.

SINTZ MOTOR.

GUY L. SINTZ, of Grand Rapids, Mich., one of the pioneer motor builders of this country, has his new 1906 motor ready for prompt delivery in quantities.

The construction of the motor is as follows: Cylinders and pistons are cast from very close grained semi-steel. Every cylinder is accurately bored and then reamed with an adjustable reamer which is fitted to a hardened steel gauge.

Every cylinder is tested under 300-pound cold water pressure, before being bored, and is also tested with the same test after each operation, and no cylinder that shows a sign of a leak is used in the construction of the motors. Sand holes are not rusted or plugged, as this is only temporary, and is bound to cause trouble sooner or later.

The pistons are finished to a perfect fit in the cylinder, and every piston is ground to a bearing in the cylinder, and fitted with three rings ½ inch wide, ¼ inch thick. These rings each have a square lap of ½ inch. The ring castings are first roughed out ⅛ inch larger in diameter than the finished size, are then reamed so as to make a square lap of ¼ inch. The lap is then ground to make a gas-tight joint, and the ring is clamped together and bored inside and turned outside. This makes a perfect fit on all points of the cylinder when the ring is first installed.

The crank shaft of the motor is a weldless steel drop forging, and great care is taken in the turning of these crank shafts. Half round fillets are left in all the corners, the bearings of the crank shafts being extra long. The bearings of the 5x5 motor are each 1⅞ inches in diameter and 5⅛ inches long. On the crank pin they are 2 inches in diameter and 2½ inches long.

The crank shafts are turned taper for attaching the fly-wheel, and are fitted with a feather key and nut. After the nut is drawn up in place it is drilled for the pin. This makes a perfectly rigid job, and one that cannot possibly loosen.

The connecting rods are of weldless steel drop forgings, ribbed with heavy fillets in all the corners. The adjustable connecting rod boxes are best grade phosphor bronze made entirely of new metal. At the lower end of the connecting rod there is a projection ¾ inch in diameter by ⅛ inch long, which is fitted into a receptacle in the upper half of the crank pin box. This insures perfect alignment and takes much of the strain from the studs.

The valves of the motor are extra large, being 2½ inches in diameter on the 16 M. P. motor, and are all operated mechanically. The gears and cams for operating these valves are all steel hardened and inclosed in the base of the motor.

The top of the base is split through the center line of the cam shaft which allows the removing of the cam shaft with gear intact without disturbing any of the pins or adjustment. This leaves the connecting rods

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Younger's Scotch Ale
after motoring or after driving, wards off a cold and clinches the benefit of your outing
"Be sure it's Younger's, though"
Imported in Stone Jugs since 1749

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You may need it. Our case contains all the necessary remedies and bandages, etc., together with full instructions. Send a dollar for it.
U.S. EMERGENCY CASE CO.
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Do you understand your Motor?
THE GAS ENGINE is a monthly magazine devoted to gasoline engines—automobile, marine, stationary. $1.00 per year. Specimen free.
THE AUTOMOBILE POCKETBOOK
By E. W. Roberts. 328 pp., leather, price, $1.50.
The Gas Engine Pub. Co. 39 OLIVER BLDG. Parkersburg, W. Va.

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We mean those which are repeated to a large number of people, exact imitation of original Typewritten Letters.
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Before you place your next order for Typewritten Letters get our prices. You can send out a thousand or a hundred thousand personal Letters in a single mail—more than your stenographer could write in a year.
This is the way the most successful business houses of to-day extend and hold to their trade. There's nothing like going after business in a direct *personal* way. It pays.
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They keep the trains on time
Between CHICAGO, ST. LOUIS, KANSAS CITY AND PEORIA
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DÎNER TABLE D'HÔTE, $1.50
SUPPERS DELIGHTFULLY SERVED
Music and Singing by Troubadours
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A New and Exquisite Cordial
A delicious blend of the juice of the finest selected Grape Fruit and the best old Cognac Fine Champagne.
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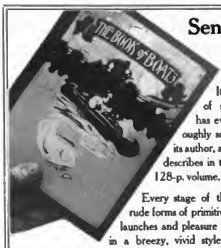
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IN BUFFALO



Modern—Highest Grade
—A model of Fireproof construction.
A favorite rendezvous for Automobile Tourists
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Rates $1.50 per day and upward
Wire **Reservations at our Expense**
GEORGE DUCHSCHERER, Prop.
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Send for this Book

It tells the whole history of small craft as no work has ever done before. Thoroughly scientific in its treatment, its author, an enthusiastic boat-lover, describes in this beautifully illustrated 128-p. volume, every type of small boats.

Every stage of their evolution, from the rude forms of primitive peoples to the efficient launches and pleasure boats of today, is traced in a breezy, vivid style, that makes the book one of absorbing interest.

Recognizing the book's interest and value, we have purchased the entire edition and author's rights.

Although originally intended to sell at $1.00, to get in touch with every boat-lover, we will send "The Book of Boats" and our attractive quarterly, "The Launch," for one year, postpaid, for **50 cents.**

When you write for the book, enclose extra stamps for our 80 page descriptive catalogue of Truscott boats, the standard of beauty, economy and service, evolved by three generations of boat-builders and constructed in the best-equipped factory in America.

"She walks the waters like a thing of life" —The Truscott "Boat.

TRUSCOTT BOAT MFG. COMPANY
Dept. 157
ST. JOSEPH MICHIGAN

Motoring Satisfaction

Is More a Matter of the USER'S KNOWLEDGE than of the Car's Quality

A Green Motorist we know paid $2,500 of Real Money for a brand-new automobile of one of the Best Makes.
He Ran it Himself for several weeks, and all went well—no failure of the Motor to Start, no Missing of Ignition, no Punctured Tires, no troubles of any sort. He had taken his wife, and his children, and his friends, and some of his enemies, for Long Runs, and was fully convinced that there was more of Sport and Utility in the New Conveyance than in any other Mechanism that ever was contrived.
Then, one day when he was driving alone—Twenty Miles from Anywhere—the motor stopped.
He Cranked It, Tested the Ignition, Adjusted the Mixture, and did all of the other things he had heard mentioned by the selling agent—without success.
Having thus wasted two hours of his Valuable Time, he walked three miles and found a Man with a Horse, who towed the machine into the Nearest Barn, charging five dollars for the service.
A dollar more went for railroad fare back to the City; and the Expenses, and Time, and Other Charges of the Repairman who was sent out to fix things up came to twenty-five dollars.
The total of these items was Thirty-One Dollars and a lot of Hard Work—more than the price of one of our courses and the trouble of understanding it—and the difficulty was a grain of sand in the atomizing nozzle of the carburetor, which any one who *knew* what he was about could *find* and *remove* in *three minutes!*
It Might Have Been Worse—it might have been something wrong with the Cooling System, which would have Overheated and Ruined the Engine; or with the Lubricating Devices, which would have Spoiled a few Bearings; or with the Brakes, which would have caused a Bad Accident.
And *any of these* would have cost *twenty times the price* of one of our Courses, which explain in *simple* and *practical* ways, with *plenty of illustrations*, just what every motorist *needs to know* and *can easily understand* about his car.
Our automobile instruction is the kind that is 100% right—the kind that is so *condensed* and *indexed* and *summarized* that *busy people grasp it by just reading it.*
Ours is not the sort of literature that is laden with mathematics and formulas, and that is written to *Show* that the writers know, instead of to *Tell* what they know.
It is the work of well-known experts—experts who know their business—but it is *predigested*, rather than technical; and it proves as interesting to the average motorist as does a Nick Carter to a hurrying messenger boy.
Now, if you want the sort of *information* that makes a Success of your car—it is better than a $5,000 car *without it*; the sort of information that confers *knowledge* without hurting the insides of people's heads, you had better write for our prospectus.
This prospectus explains the details of our motor-boat, motorcycle, and automobile courses, and answers the questions that cannot be answered here. It also shows how our work is endorsed by prominent manufacturers, club and association officials, racing men, trade-paper editors, and others whose standing in the automobile industry lends authority to what they say.
Just a moment of Time and a postage stamp, and the prospectus is yours for the asking. Write now, to

THE CORRESPONDENCE SCHOOL OF AUTOMOBILE ENGINEERING

—FILL OUT TEAR OFF MAIL TO-DAY—

THE CORRESPONDENCE SCHOOL OF AUTOMOBILE ENGINEERING
Suite 6113, Flatiron Building, New York City

Please send to my address by return mail, a free circular, giving full particulars of your correspondence courses, including free lesson and "Dictionary of Motoring Terms."

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Or write for circular without sending coupon.

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AN IDEAL MATERIAL
FOR
AUTOMOBILES
AND
MOTOR BOATS

FOR CANOPY AND CAPE TOPS—Pantasote top materials give a handsome finish to the car; are more durable than real leather; are absolutely water, stain and grease proof; and vastly superior to the various rubber and inferior imitations of leather, as Pantasote always remains soft and pliable, and is not affected by climatic conditions. The large use of it for this purpose in 1905 demonstrated its superiority, and has resulted in Pantasote being Standardized for Tops by a large number of Manufacturers for their 1906 cars.

FOR SEATINGS—Pantasote Leather wears better than the natural hide; it contains no oils to dry out, and is impervious to weather; will not crack, peel or chip.

A WORD OF CAUTION

It has recently been brought to our attention that in some instances cheap, worthless imitations have been substituted for Pantasote, the dealer thereby securing a larger profit for himself. These imitations look like Pantasote when new, but their surface soon becomes hard and brittle, crumbles off, and looks speedy. Misrepresentation or substitution is a penal offense under the "Trade-Mark" law, and will be prosecuted by us wherever discovered.

Do not be misled by statements that Pantasote is a name representing a variety of leather substitutes. There is only one genuine Pantasote Leather. Made and sold by The Pantasote Company.

We will be pleased to forward samples to anyone upon application.

THE PANTASOTE CO.

11 Broadway, NEW YORK CITY **926 Monadock Bldg., CHICAGO**



and crank shaft easily accessible if necessary.

Great care is taken in setting the valves of these motors, the maker guaranteeing that there is not a variation of more than 1/100th of an inch on the circumference of the fly-wheel between the relative positions of the crank in the opening and closing of the valves on the two cylinders. This gives a perfectly steady motion and increases the power. The valves can be removed and reground in these motors without disturbing any other part of the motor.

The Sintz transmission gears are guaranteed to transmit 90 per cent. more power than their rating. This gear has two speeds, forward and reverse, the high speed gear being direct through an internal expanding band clutch inclosed in the case of the transmission and operated and adjusted from the outside. The spline and screw for operating and adjusting clutch is steel hardened. The internal gears for the low speed and reverse are made from weldless steel ring and accurately machined with planed teeth. On the 16 M. P. transmission there are 24 teeth in mesh at one time which are 1 inch face, 8 inch pitch. This transmission case is oil-tight and dust-proof. The outside of the drums are recessed to accommodate the brake bands. This keeps the bands in position and makes a much more sightly outfit.

A case is furnished to entirely inclose the transmission gear, which is oil-tight and dust-proof. By this means the whole transmission runs in oil which materially increases its life.

The timer has been given a six months' test under the most trying conditions before placing it on the market.

By its construction there is absolutely no wabble of the commutator, and it is impossible for the contact points to become loosened, as is the case with timers that have contact points fastened to the outside of the fibre. The contact points of the timer pass through the center of the fibre.

The brush of this commutator is a hardened steel roller, the contact points are also hardened steel. It is inclosed in a case with a mica front which is practically indestructible, and makes the commutator dust-proof and oil-tight. The commutator is finished for any size shaft desired.

The commutators are finely finished, the case being of the best bronze highly polished.

The maker will furnish a sample commutator to any manufacturer of motors or motor-cars for trial, and if it does not do all that he claims for it, it can be returned at his expense.

THE FRENCH MOTOR BOATS OF 1906.

HARD work is being done in the shipyards in view of the great tests of 1906. The hulls of the future competitors of Monaco are already on the stocks. At Tellier Fils and Gerard's the *Rapière II.*, the small 26-foot Panhard-Levassor, is assuming shape, as are two cruisers, the names of which have not been revealed. At Pitre & Cie's a large 38-foot racer is finished and awaits a 300 M. P. Levassor motor, while the construction of the *Antoinette II.* has been begun. The plans, too, of several cruisers that will be provided with Mors motors have been prepared. The establishment of Rue de Theatre will also be represented by two racers. Let us note, however, that the *4-Parisienne*, reconstructed in an up-to-date style, will be provided with two 100 M. P. motors.

At Pierre's, at Joinville, Cherreux is putting on the stocks a 38-foot racer which is to be driven by a 300 M. P. Mercedes motor.

It is said that Panhard and Levassor are preparing special motors of 7-inch bore and stroke that will give about 150 M. P. It is said, too, that the *Grand-Trefle* has been undergoing some trials that were satisfactory and will present itself at Monaco just as it appeared in April last.

Finally, Blondeau and Deschamps are planning a number of cruisers (*Delahayez*, probably), which will be put on the stocks ere long.

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FOR BETTER LUBRICATION

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NON-FLUID OILS

ELIMINATE LUBRICATION TROUBLES. 7-8ths why the leading mfrs. use and recommend them as standard for auto. lubrication.

Don't accept substitutes or the "just as good" offer. If your dealer can't supply you, we will send *free sample prepaid.*

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B. B. Auto Oil. Premium Valve Auto Oil.

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RILEY "AUTO" ROBES

Are Right

THE STANDARD FOR ALL SEASONS

¶ These robes distinctly outclass anything of their kind and appeal particularly to the finest trade.

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Constant Sight Feed No Liquids

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USE **ALBANY GREASE**

THIS TRADEMARK ON EVERY PACKAGE



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LOOK OUT FOR YELLOW LABEL

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It is the only auto lubricant.
It is the standard "auto" lubricant.
It is always uniform in quality.
Can be used in any style or make of Compression Cup.
It prevents cutting of the threads.
It prevents fuel journals and metal cups.
It will always bring you back in good condition.
It is the cleanest and cheapest of lubricants.
IT IS USED BY MOST MANUFACTURERS OF AUTOMOBILES TO START THEIR NEW MACHINES.
It is endorsed and used the world over from Engines and Mill Supply Houses, Hardware and Oil Dealers.

Use No. 2 grade for Winter and No. 3 for Summer. For Transcontinental or ensemble grease use No. 1 in Summer, and No. 2 in Winter. The quality of the grades is the same, the difference is only in consistency.

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If you want to buy or sell a second-hand car see Motor Bureau page 9.

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RELIABILITY

POPE-HARTFORD MODEL F *Over a quarter of a century's experience* in making mechanical vehicles has culminated in the production of our 1906 POPE-HARTFORD MODEL F. The car has a 4-cylinder, vertical water-cooled engine; cylinders cast in pairs; all gears encased; sliding gear transmission, three speeds forward and reverse; specially designed carburetter, bevel gear drive through propeller shaft to the rear axle; non-removable, dust-proof, side-entrance tonneau. Every detail of design, construction, finish and equipment has been studied for the satisfaction and comfort of the fastidious motorist. "The wonder of the Automobile Shows": (Top $125 extra). Price $2800.

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(*Continued from Page 173.*)

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for

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BY APPOINTMENT TO

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who owns one"

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The Metallic Rubber Tire Company claims that we infringe certain patents owned by them.

We beg to inform our customers that we will defend them, and hold them harmless against any action or proceeding which may be taken against them on such patents.

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Handsomest Car on the Market



No car at the Automobile Shows—among all the hundreds from American and European factories—won higher praise for beauty of appearance and performance than the WINTON MODEL K.

Nor did any car actually demonstrate greater Ease of Operation and Control.

The WINTON MODEL K went through congested traffic on the high gear (without juggling of levers or pedals) where other cars required changes of gear.

Its 30 h. p. motor carried the WINTON MODEL K up the grades at greater speed than any car having less than 40 h. p.

The WINTON MODEL K engine ran noiselessly and without fault.

The car's gracefully beautiful body lines and its wonderfully comfortable upholstery and Winton Twin Springs won heartiest approval.

All the buying public marveled that such superb value could be purchased at $2,500.

Unquestionably the WINTON MODEL K is the best $2,500 motor car ever built. It is worth (according to current market prices) at least $3,500.

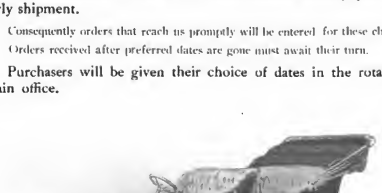
If your business judgment commends the saving of $1,000 on an automobile purchase, you will buy a WINTON MODEL K. Better place your order early, because the preferred delivery dates are rapidly being taken.

We find that the number of future deliveries already promised leaves but very few cars available for early shipment.

Consequently orders that reach us promptly will be entered for these choice delivery dates.

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Purchasers will be given their choice of dates in the rotation in which orders are received at our main office.



MODEL K WINTON—Four vertical, water-cooled cylinders, 30 h. p. or more. Quiet running. Magnificent reserve power. Velvety, non-jar, non-shock, non-breakable transmission. Flexible speed control. Shooting oiler. Exclusive Twin Springs. Easy riding. And every other feature that a first-class car should have. $2,500 f. o. b. Cleveland. Compare it with cars selling at $3,500 and more

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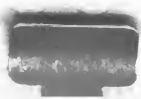
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